GRADED LESSONS IN ARITHMETIC

BY

W. F. Nichols

GRADE II.

THOMPSON, BROWN & CO.
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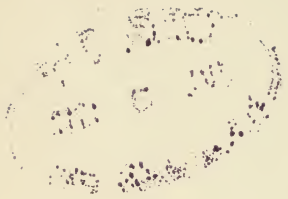
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IN

ARITHMETIC

GRADE II.



BY

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52994-c2-1

THOMPSON, BROWN & CO.

BOSTON. CHICAGO.

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GENERAL INTRODUCTION.

1. These lessons have been prepared in the belief that it is a mistake to assume that one topic is to be finished before another is begun. The elements of many topics are here given in the lower grades in explanations, illustrations, and examples easily understood by the younger pupils, and then the work in each topic is made more and more difficult through the various grades until it is finished. These examples have stood the test of the school-room, and in no case have they been found too difficult.

2. The arrangement of the topics is such that pupils in passing into a new grade find but few new topics, and many pupils are prepared for promotion from grade to grade at various times during the year, and are not obliged to wait for the annual promotions.

3. Such practical subjects as Percentage and Interest are introduced in the lower grades, where many pupils are found who are obliged to leave school before they reach the more advanced grades.

4. Clear conceptions of geometric forms and mensuration are introduced at an early period, that principles thus developed may be applied to many practical problems.

5. One or more lessons are given to the developing of a new topic; then the following lessons are so arranged as to give the pupils practice in applying the new topic in

connection with all the other topics previously learned. This constant review will be found very beneficial.

6. Few teachers will find the need of supplementary work, as so large a number of problems are given. On the other hand, few pupils should be required to solve all the problems. It is a good way to assign for required work for all the class that number of examples which even the slowest child can do, and then allow any child to work the remaining examples of the lesson as optional work.

7. The large amount of oral or mental examples will be appreciated by those who believe that ten minutes each day should be given to work of this kind. These are not mental gymnastics, but plain, practical, every-day questions.

8. The introduction of Algebra and Geometry in the higher grades will be found beneficial.

9. The methods here advocated are the shorter methods found in daily use among bankers, mechanics, and merchants.

WILBUR F. NICHOLS.

HOLYOKE, *September*, 1897.

INTRODUCTION TO GRADE II.

This book is designed for pupils of the second year in school. While it contains a review of the work of Grade I, pupils, who have not had the benefit of a Kindergarten training, or of Grade I drill, will need to have certain principles and definitions more carefully explained.

Pupils are supposed to know: 1. The combinations in the numbers from 1 to 10. 2. The following parts of units and collections of units: $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$. 3. To recognize the inch, foot, and yard as wholes. 4. The meaning of parallel, vertical, horizontal, adjacent, and perpendicular. 5. To recognize angles, right, acute, and obtuse. 6. To recognize the square, rectangle, and triangle. 7. To recognize the square inch as the unit of measurement of surfaces. 8. To determine the number of square inches in squares and rectangles by observation: covering larger forms with pasteboard squares, and counting the number used. 9. To find perimeters of squares, rectangles, and triangles. 10. To recognize the inch cube as the unit of measurement of solids.

Starting with this knowledge, which is usually given in all Kindergartens, the work in this grade advances logically, as the mind of the child expands.

These lessons have been used regularly for some time, and thoroughly tested in a second grade, and have been found simple enough for the pupils.

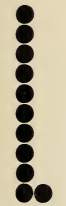
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GRADED LESSONS IN ARITHMETIC.

GRADE II.

LESSON 1.



$10 + 1 = 11$

$1 + 10$, or $10 + 1 = 11$
$2 + 9$, or $9 + 2 = 11$
$3 + 8$, or $8 + 3 = 11$
$4 + 7$, or $7 + 4 = 11$
$5 + 6$, or $6 + 5 = 11$

$I = 1$
$II = 2$
$III = 3$
$IV = 4$

1.	2.	3.	4.
$10 + 1 = ?$	$4 + ? = 11$	$? + 2 = 11$	$9 + 2 = ?$
$7 + 4 = ?$	$6 + ? = 11$	$? + 9 = 11$	$6 + 5 = ?$
	$7 + ? = 11$	$? + 1 = 11$	$4 + 7 = ?$
	$8 + ? = 11$	$? + 4 = 11$	$8 + 3 = ?$

Add by lines and columns:

	5.	6.	7.	8.		13.	14.	15.	16.
9.	3	+ 3	+ 3	+ 1 = ?	17.	2	+ 5	+ 2	+ 1 = ?
10.	2	+ 5	+ 3	+ 1 = ?	18.	1	+ 4	+ 2	+ 3 = ?
11.	4	+ 2	+ 2	+ 3 = ?	19.	3	+ 1	+ 4	+ 2 = ?
12.	2	+ 1	+ 1	+ 6 = ?	20.	5	+ 2	+ 1	+ 3 = ?

Sight addition:

21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
4	7	6	2	5	3	7	6	5	5
3	3	5	8	4	6	4	4	2	6

1.	2.	3.	4.
$11 - ? = 2$	$11 - ? = 8$	$4 + 3 = ?$	$11 - 4 = ?$
$11 - ? = 4$	$11 - ? = 7$	$5 + 5 = ?$	$7 + 4 = ?$
$11 - ? = 9$	$11 - ? = 3$	$6 + 3 = ?$	$3 + 7 = ?$
$11 - ? = 5$	$11 - ? = 10$	$8 + 3 = ?$	$3 + 3 = ?$
$11 - ? = 6$	$11 - ? = 1$	$10 - 1 = ?$	$9 + 2 = ?$

5.	6.	7.	8.
$2 \times 2 = ?$	$10 \div 5 = ?$	$\frac{1}{2}$ of $4 = ?$	$\frac{1}{2}$ of $7 = ?$
$2 \times 5 = ?$	$8 \div 2 = ?$	$\frac{1}{3}$ of $9 = ?$	$\frac{1}{2}$ of $9 = ?$
$2 \times 1 = ?$	$6 \div 3 = ?$	$\frac{1}{4}$ of $8 = ?$	$\frac{1}{2}$ of $11 = ?$
$2 \times 4 = ?$	$9 \div 3 = ?$	$\frac{1}{2}$ of $5 = ?$	$\frac{1}{3}$ of $10 = ?$
$2 \times 3 = ?$	$8 \div 4 = ?$	$\frac{1}{2}$ of $6 = ?$	$\frac{1}{3}$ of $7 = ?$

9. In a brood of ten chickens, one chicken was white and the rest were black. How many were black?

10. If you had a ten-cent piece and bought 3 bananas at 3 cents each, how much would you have left?

11. I have 3 three-cent pieces, and a two-cent piece. How much money have I?

12. How much must you pay for 3 three-cent stamps and a two-cent stamp?

13. What will 10 glass balls cost at a cent a ball?

14. Rose is 7 years old, and her brother is 2 years older. How old is her brother?

15. If you have been at school 2 weeks and one day this term, how many days have you been at school?

16. Mary had 11 oranges, and gave her sister 7 of them, how many had she left?

17. If you buy 11 quarts of milk, how many gallons do you buy?

18. Nellie had 11 cents; she spent 4 of them, lost 2, and gave away 3; how many had she left?

1. Draw 11 parallel lines, each one inch long.
2. Draw 1 line 11 inches long.
3. Draw 11 squares, each side one inch long.
4. Draw 11 triangles.
5. Measure a line on the floor 11 feet long.
6. 11 is how many more than 5? 7? 9? 10? 8? 6? 4? 2? 1? 3?
7. Cut a string 1 foot long. Cut off 11 inches from this string. Measure the length of the piece that is left.
8. Cut a string 11 feet long. Cut off from this a piece 3 yards long. How much is left?
9. What two different pieces of money make 11 cents?
10. How many windows are there in 3 rooms, if there are 3 windows in each room?
11. Make an example for $11 - 3 = 8$.
12. Make an example for $6 + 5 = 11$.
13. Make an example for $8 + 3 = 11$.
14. Make an example for $7 + 4 = 11$.
15. Make an example for $11 - 10 = 1$.
16. Make an example for $11 - 5 = 6$.
17. Make an example for $11 - 6 = 5$.

Fill the blanks with suitable words: —

18. 8 () and 3 () are —— ().
19. 9 () and 2 () are —— ().
20. 7 () and 4 () are —— ().
21. 5 () and 5 () are —— ().
22. 10 () and 1 () are —— ().
23. 11 () less 4 () are —— ().
24. 11 () less 8 () are —— ().
25. 10 () less 7 () are —— ().
26. 3 () and 8 () are —— ().
27. 5 () and 4 () are —— ().
28. 6 () and 5 () are —— ().

1.	2.	3.	4.
$2 + 8 = ?$	$6 + 3 = ?$	$9 + 1 = ?$	$9 + 2 = ?$
$5 + 2 = ?$	$2 + 2 = ?$	$6 + 4 = ?$	$4 + 3 = ?$
$2 + 6 = ?$	$8 + 1 = ?$	$7 + 4 = ?$	$1 + 4 = ?$
$1 + 7 = ?$	$7 + 1 = ?$	$2 + 3 = ?$	$6 + 5 = ?$
$2 + 5 = ?$	$7 + 3 = ?$	$4 + 4 = ?$	$2 + 7 = ?$

5.	6.	7.	8.
$1 + 1 = ?$	$7 + 2 = ?$	$4 + 7 = ?$	$2 + 4 = ?$
$2 + 1 = ?$	$3 + 5 = ?$	$5 + 5 = ?$	$5 + 4 = ?$
$8 + 2 = ?$	$1 + 3 = ?$	$3 + 7 = ?$	$3 + 3 = ?$
$1 + 9 = ?$	$6 + 2 = ?$	$1 + 5 = ?$	$4 + 2 = ?$
$3 + 1 = ?$	$0 + 6 = ?$	$4 + 1 = ?$	$6 + 1 = ?$

9.	10.	11.	12.
$4 + 6 = ?$	$2 + 9 = ?$	$3 + 4 = ?$	$\frac{1}{2}$ of $2 = ?$
$1 + 6 = ?$	$5 + 6 = ?$	$7 + 0 = ?$	$\frac{1}{2}$ of $3 = ?$
$3 + 6 = ?$	$3 + 2 = ?$	$8 + 3 = ?$	$\frac{1}{2}$ of $4 = ?$
$5 + 3 = ?$	$5 + 1 = ?$	$4 + 5 = ?$	$\frac{1}{2}$ of $6 = ?$
$8 + 0 = ?$	$1 + 8 = ?$	$3 + 8 = ?$	$\frac{1}{2}$ of $8 = ?$

Sight addition:

13.	14.	15.	16.	17.	18.	19.	20.	21.
3	4	5	6	5	3	2	6	5
2	3	4	2	3	4	3	3	3
5	2	2	3	2	2	4	2	3

22.	23.	24.	25.	26.	27.	28.	29.	30.	31.
9	6	8	4	5	8	5	2	3	7
2	5	3	7	4	2	6	9	8	4

1. If your mother gives you a 5-cent piece, a 2-cent piece, and 4 cents, how much money does she give you?

2. Some boys are coasting on a hill. There are 5 boys coming down and 6 boys going up. How many boys are there in all?

3. If 7 of these boys have sleds, how many boys do not have sleds?

4. Wilfred went out to the barn to find some eggs for his mother. He found 7 eggs in one nest, and 4 in another; how many did he find in all? If his mother should use 3 of them, how many would be left?

5. If you go to the store with 11 cents, and buy 5 oranges that are 2 cents each, how much money will you have left?

6. If you take a dime and a cent to the store, and buy some pears at 3 cents each, how many pears can you buy, and how much money will you have left?

7. If you pay 11 cents for 5 strings of blue beads, and 6 strings of red ones, how much do you pay for 1 string?

8. If you spell 3 words on Monday, 1 on Tuesday, 4 on Wednesday, 2 on Thursday, and 1 on Friday, how many words do you spell during the week?

9. Two boys, Ned and Willie, were passing ball, and each threw it 11 times. Ned missed it twice and Willie two times; how many times did each catch it?

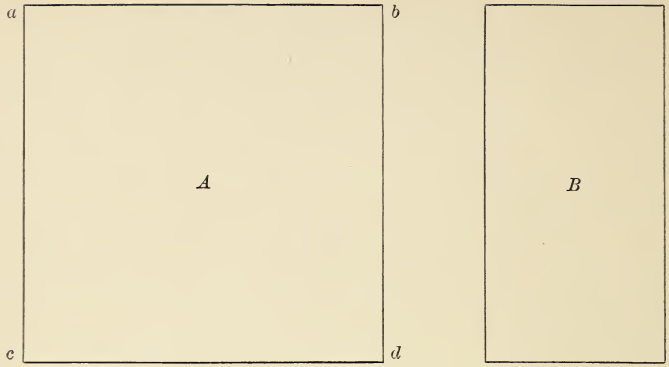
10. If Mary has 11 words to learn to spell, but misses 4, how many does she spell?

11. If you should tap a maple tree to get the sap, and should get $1\frac{1}{2}$ gallons in the morning, and 5 quarts at night, how many quarts would you get during the day?

12. Write all the numbers that make 11.

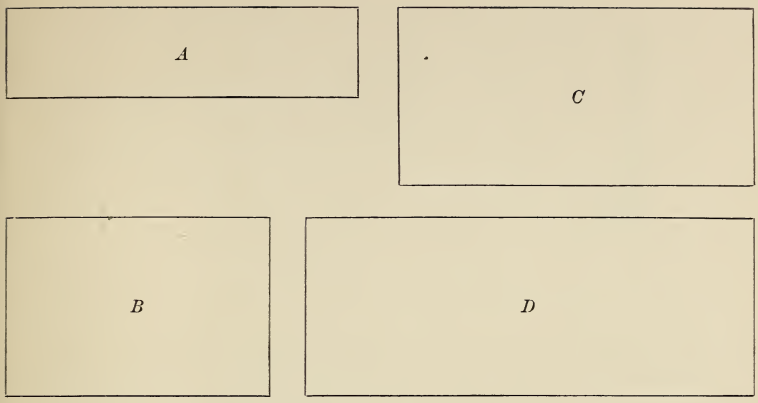
13. Take 11 sticks, and form 2 squares and 1 triangle; how many sticks have you left?

14. Find 11 vertical lines in the room.



1. What is each figure called?
2. How many sides has each?
3. How many right angles has each?
4. How many pairs of parallel lines has each?
5. How many pairs of adjacent lines has each?
6. How much longer is A than B?
7. How much wider is A than B?
8. How many square inches in A?
9. How many square inches in B?
10. How many more square inches in A than in B?
11. How much larger is A than B?
12. What is the perimeter of A? Of B?
13. How much greater is the perimeter of A than of B?
14. How many vertical lines in each? How many horizontal?

NOTE. — If pupils have not had the preliminary work of the first grade, they should now be trained to recognize square rectangles, as A; oblong rectangles, as B; parallel lines, as ab and cd; adjacent lines (lines that meet), as bd and cd; vertical lines, as ac and bd; horizontal lines, as ab and cd; perpendicular lines (lines that meet at right angles), as ac and dc; perimeter. Pupils at this point should not be compelled to memorize definitions of these terms. Each child should be provided with a foot rule, and taught to use it frequently.



1. Make figures the same shape as each of these, but twice as long and wide.

2. Divide each of the figures into inch squares.

3. Count the square inches in each figure.

4. How many rows of inch squares do you have in each figure?

5. Which figure is the largest?

6. Which figure is the smallest?

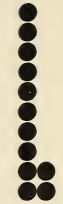
7. Count the inches in the perimeter of each figure.

8. Which has the greatest distance around it?

9. Make a figure the same shape as *A*, but four times as long and twice as wide.

10. Cut at home without measuring, and bring to school to-morrow, 2 square rectangles, each side 4 inches, and 2 oblong rectangles, 4 inches long and 2 inches wide.

11. Cut these figures out of paper at home to-night, and bring them to school to-morrow. Mark on each the number of inches that there are round it, and the number of square inches that there are in it.



10 + 2 = 12

1.

2 + 10 or 10 + 2 = 12
3 + 9 or 9 + 3 = 12
4 + 8 or 8 + 4 = 12
5 + 7 or 7 + 5 = 12
6 + 6 = 12

2.

V = 5
VI = 6
VII = 7
VIII = 8
IX = 9

3.	4.	5.	6.
4 + 8 = ?	8 + ? = 12	? + 5 = 12	12 − 8 = ?
6 + 6 = ?	6 + ? = 12	? + 7 = 12	12 − 4 = ?
7 + 5 = ?	2 + ? = 12	? + 4 = 12	12 − 9 = ?
2 + 10 = ?	11 + ? = 12	? + 9 = 12	12 − 3 = ?

7.	8.	9.	10.
12 − 10 = ?	12 − ? = 9	? − 4 = 8	7 + 5 = ?
12 − 5 = ?	12 − ? = 7	? − 6 = 6	3 + 9 = ?
12 − 6 = ?	12 − ? = 5	? − 5 = 7	8 + 4 = ?
12 − 2 = ?	12 − ? = 3	? − 10 = 2	2 + 10 = ?

11.	12.	13.	14.
1 × 2 = ?	6 × 2 = ?	2 ÷ 2 = ?	9 ÷ 2 = ?
2 × 2 = ?	1 × 3 = ?	6 ÷ 2 = ?	4 ÷ 2 = ?
3 × 2 = ?	2 × 3 = ?	10 ÷ 2 = ?	7 ÷ 2 = ?
4 × 2 = ?	3 × 3 = ?	12 ÷ 2 = ?	11 ÷ 2 = ?

15.	16.	17.	18.
3 ÷ 3 = ?	12 ÷ 4 = ?	½ of 12 = ?	⅓ of 9 = ?
12 ÷ 3 = ?	8 ÷ 4 = ?	⅓ of 12 = ?	¼ of 8 = ?
9 ÷ 3 = ?	5 ÷ 4 = ?	¼ of 12 = ?	⅓ of 6 = ?
6 ÷ 3 = ?	4 ÷ 4 = ?	½ of 10 = ?	½ of 11 = ?

Copy and learn: —

12 single things or units make one dozen.
doz. stands for dozen.

1. What number is one-half of twelve?

2. How many threes are there in a dozen?

3. Luther paid 12 cents for 4 bananas; how much was that for one?

4. How many plums will it take to give Frank and 5 other children 2 plums each?

5. Grace is 4 years old; how long must she live to be 12?

6. When apples are worth 2 cents each, how much is ½ doz. worth?

7. What number is doubled to make 12?

8. How many horns have three yoke of oxen?

9. How many must you add to each of following numbers to get 12: 9? 7? 4? 6? 8? 5? 3? 11? 2?

10. Jennie is now 12 years old; how old was she 7 years ago?

11. Which costs more, a dozen of lemons at a cent each, or a half-dozen oranges at 2 cents each?

12. If crackers are 6 cents a half-pound, what will a pound cost?

13. If apples are 12 cents a dozen, how many can you buy for 7 cents?

14. Jennie's mother divided 12 red cherries among Jennie and her two brothers; how many cherries did each have?

15. How many threes in ½ of 12?

16. One-half of 10 from 11 leaves ½ of what number?

17. Subtract 3 from 11, divide by 4, add 3, multiply by 2, subtract 8, multiply by 3, and add 6; how much have you?

18. John found 4 eggs in one nest, 3 eggs in another, and 5 in another. How many eggs did he find?

Take your foot-rule, and find how many inches there are in a foot. Take the yard-stick, and find out how many feet there are in a yard.

Copy and fill blanks: —

— inches make one foot. in. stands for inch or inches.

— feet make one yard. ft. stands for foot or feet.

yd. stands for yard or yards.

1. Draw a line 1 foot long, and divide it into 12 equal parts. How long is one of these parts?

2. What part of a foot is 6 inches? 4 inches? 3 inches?

3. How many inches is $\frac{1}{3}$ of a foot? $\frac{1}{2}$ of a foot? $\frac{1}{4}$ of a foot?

4. Draw a line on the board or floor 12 feet long. Divide it into 4 equal parts. What is one part called?

5. What part of a yard is a foot?

6. Draw a square foot; a square yard.

7. Draw an oblong that shall contain 12 square feet.

8. How long is your oblong, and how wide is it?

9. Make another different oblong that shall contain 12 square feet. How long and how wide is it?

10. Cut out of paper, and bring to school to-morrow, 2 squares that shall contain 1 square foot each.

11. Cut out an oblong that is 4 inches long and 3 inches wide. How many square inches in it?

12. Cut out an oblong that is 6 inches long and 2 inches wide. How many square inches in it?

13. Form 9 squares into one large square. How many feet long is your large square? How many feet wide is it? How many yards long is it? How many yards wide is it? How many square yards are there? How many square feet did you use to form your square yard?

NOTE. — The teacher should provide many squares, in order to furnish each child with squares enough to perform the work and answer the questions in Example 14. The teacher should not do this work for the child.

1. Subtract:

10	11	9	7	12	7	9	9	9	10	6
9	2	5	3	6	5	4	8	6	3	3

2. Subtract:

11	9	11	11	8	12	10	12	11	10	12
6	2	7	8	4	3	5	7	5	7	8

3. Add:

1	9	2	4	5	3	4	2	3	6	1	4
4	3	8	6	2	4	8	3	8	3	9	5

4. Add:

8	7	7	6	2	7	5	9	8	5	6	8
4	4	2	3	9	5	5	3	2	6	4	3

5. Multiply:

2	4	6	4	5	2	3	7	3	3	8	10
2	2	2	3	2	4	4	1	3	2	1	0

6. Divide: $2\overline{)10}$ $3\overline{)12}$ $3\overline{)9}$ $2\overline{)6}$ $4\overline{)8}$

$4\overline{)12}$ $2\overline{)12}$ $2\overline{)8}$ $6\overline{)12}$ $5\overline{)10}$

7.	**8.**	**9.**	**10.**
$1 \times 2 = ?$	$5 \times 2 = ?$	$3 \times 4 = ?$	$2 \times 5 = ?$
$4 \times 2 = ?$	$3 \times 2 = ?$	$1 \times 5 = ?$	$2 \times 4 = ?$
$6 \times 2 = ?$	$1 \times 3 = ?$	$2 \times 3 = ?$	$4 \times 3 = ?$

11.	**12.**	**13.**	**14.**
$\frac{1}{2}$ of $2 = ?$	$\frac{1}{2}$ of $8 = ?$	$\frac{1}{3}$ of $3 = ?$	$\frac{1}{3}$ of $12 = ?$
$\frac{1}{2}$ of $4 = ?$	$\frac{1}{2}$ of $10 = ?$	$\frac{1}{3}$ of $6 = ?$	$\frac{1}{4}$ of $4 = ?$
$\frac{1}{2}$ of $6 = ?$	$\frac{1}{2}$ of $12 = ?$	$\frac{1}{3}$ of $9 = ?$	$\frac{1}{4}$ of $8 = ?$

a	4	7	8	9	3	5	1	8	2	6	*a*
b	7	3	4	2	8	6	9	3	7	6	*b*
c	5	8	5	6	4	3	2	9	5	4	*c*
d	6	4	7	5	7	9	8	2	7	8	*d*
e	4	7	3	7	4	2	4	8	4	2	*e*
f	8	3	8	2	6	8	7	4	8	9	*f*
g	3	9	2	9	5	3	5	6	3	1	*g*
h	9	1	9	2	7	9	6	5	8	9	*h*
i	1	8	2	8	2	3	4	7	4	3	*i*
j	8	2	7	3	9	8	7	3	6	8	*j*
k	4	9	1	8	2	2	5	8	5	3	*k*
l	3	1	5	3	9	8	4	1	3	6	*l*
m	9	9	6	2	1	1	5	9	7	4	*m*
n	2	3	4	4	5	8	6	1	5	8	*n*
o	6	5	7	8	4	3	5	9	5	4	*o*
p	5	7	4	3	6	7	4	2	3	6	*p*

Practice until every pupil can give the sum of any two lines at sight. Numbers below 12.

1. Mark on the board a figure 2 feet long and 2 feet wide. How many square feet in the figure?

2. Make another figure 1 foot long and 1 foot wide. How many square feet in it?

3. Cut a piece of paper the size of the smaller figure. How many pieces of that size will it take to cover the larger one?

4. Make another figure 1 yard long and 1 yard wide. How many square yards are in it? Find by measuring how many square feet are in it.

5. Make a figure 9 feet long and 1 foot wide. Find how many square feet are in it. To how many square yards is it equal?

6. What is the area of a flower-bed 1 yard long and 3 feet wide? Prove it by drawing the figure on the board.

7. Draw a rectangle 6 inches long and 2 inches wide. Divide it into equal squares.

8. Draw another rectangle one-half as large as the first. How many square inches does it contain?

9. Make a figure 12 inches long and $\frac{1}{3}$ of a foot wide.

10. Make a figure $\frac{1}{2}$ of a foot long, and $\frac{1}{4}$ of a foot wide.

11. Draw a right-angled triangle, the sides of which are 3 inches, 4 inches, and 5 inches. How many inches is it around it?

12. Draw a rectangle 4 inches long and 3 inches wide. Divide this rectangle into two triangles.

13. How many square feet in a flower-bed 2 feet wide and 4 feet long?

14. How many feet around the edge of this flower-bed?

15. Draw a square that contains 4 square inches.

16. Draw a square that contains 9 square inches.

17. A rectangle is 4 inches long and 2 inches wide; what is its perimeter?

1. Take 12 one-inch sticks. How many squares can you make if you put one stick on each side?

2. How many triangles can you make, using one stick on a side?

3. Put 12 sticks into one triangle with same number of sticks on a side. How many have you used on a side?

4. Put 12 sticks into one square. How many have you used on a side?

5. How many rectangles, 4 inches long and 2 inches wide, can you make with 12 sticks?

6. With your 12 sticks make a rectangle that is twice as long as it is wide. How long and how wide have you made it?

7. With your sticks make a triangle that is $\frac{1}{3}$ of a foot on each side.

8. With your sticks make a triangle that is $\frac{1}{4}$ of a foot on each side. How many sticks are left over?

9. With your sticks make a square that is $\frac{1}{4}$ of a foot on a side.

10. Arrange your sticks in one horizontal line.

11. Arrange your sticks in one vertical line.

12. Arrange them in 6 parallel horizontal lines. How many are in each line?

13. Arrange them in 4 parallel vertical lines. How many sticks are in each line?

14. Make 6 acute angles; 6 right angles; 6 obtuse angles.

15. Copy and learn: —

12 things make a dozen.
12 inches make a foot.
12 months make a year.

16. The names of the months are: January, February, March, April, May, June, July, August, September, October, November, December.

1. Write the names of the months of the year.

2. December, January, and February are called the winter months. What part of the whole year are winter months?

3. March, April, and May are called spring months. What part of the year are spring months?

4. June, July, and August are called summer months. What part of the whole year are summer months?

5. September, October, and November are called fall or autumn months. What part of the whole year are autumn months?

6. Three is what part of 12?

7. Write the names of the spring months.

8. Write the names of the summer months.

9. Write the names of the autumn months.

10. Write the names of the winter months.

11. If I have 11 cents, how many pears can I buy at 2 cents each? and how many cents will I have left?

12. 7 trees are on one side of a street, and 5 on the other side. How many trees are on the street?

13. From 12 take 3, divide by $\frac{1}{3}$ of 9, multiply by $\frac{1}{2}$ of 8, divide by $\frac{1}{3}$ of 6, add 4; write the answer.

14. From 11 take 1, take away $\frac{1}{2}$ of what is left, add 3, divide by 2 times 2, multiply by $\frac{1}{2}$ of 12. How much is it?

15. What part of 12 lilies are 6 lilies?

16. What part of 10 lilies are 5 lilies?

17. What part of 8 cents are 2 cents?

18. What part of 9 cents are 3 cents?

19. What part of 12 boxes are 4 boxes?

20. What part of 12 boxes are 3 boxes?

21. If Helen pays 8 dollars for a fur cape and 4 dollars for a music-box, what will both cost her?

22. How many cents are 5 cents, and 3 cents, and 2 cents, and 1 cent?

1. Copy and learn: —

Jan. stands for January.
Feb. stands for February.
Aug. stands for August.
Sept. stands for September.
Oct. stands for October.
Nov. stands for November.
Dec. stands for December.

2. Write the names of all the months in the year.

3. Write the names of the seasons.

4. Write the names of the months that make each season.

5. Write the name of the present month.

6. How many months in ½ of a year?

7. What month will it be 3 months from now?

8. What season will it be 4 months from now?

9. How many months from January to October?

10. How many months from April to July?

11. In what month is your birthday?

12. How many quarts of milk in 12 pints?

13. If a dozen chickens cost 8 dollars, what does ½ a dozen cost?

14. John bought 12 marbles at 1 cent each. He sold ½ of them at 2 cents each, and gave 4 marbles to his brother. How much money had he then? and how many marbles had he left?

15. William got 6 credit marks on Monday, and 6 more on Tuesday. How many did he get on both days?

16. George picked 12 peaches from a tree, and gave 3 of them to a little sick boy. How many did he have left?

17. Joseph picked 5 quarts of blackberries, and his brother 7 quarts; how many quarts did both pick?

18. If an orange costs 5 cents and a lemon 4 cents, how much will both cost?

19. Henry gave 4 cents for an orange, and 3 cents for a pear, and 2 cents for an apple; how many cents did he give for all?



NOTE. — It is understood that a set of Liquid Measures are provided for the room, so that the pupils may intelligently perform this work.

1. Take the smallest measure, the gill; fill it with water, and pour it into the next larger one, the pint. Continue to do so till the pint measure is full. How many gills make a pint?

2. In the same way find out how many pints make a quart.

3. In the same way find out how many quarts make a gallon.

4. Write this table on your paper, filling the blanks:

— gills make 1 pint. gi. stands for gill or gills.
— pints make 1 quart. pt. stands for pint or pints.
— quarts make 1 gallon. qt. stands for quart or quarts.
gal. stands for gallon or gallons.

5. Learn and recite the table you have just made.

6. How many pints in a quart? In a gallon?

7. How many gills in a pint? In a quart?

8. What part of a gallon is 1 quart?

9. What part of a gallon is 2 quarts?

10. What part of 1 quart is 1 pint?

11. What part of a quart is 2 pints?

12. What part of a gallon is 4 quarts?

13. What part of a pint is 4 gills?

14. What part of a pint is 2 gills?

15. What part of a pint is 1 gill?

16. What part of a quart is 4 gills?

17. If 1 quart of milk costs 6 cents, what will 2 quarts cost?

18. If your oil-can holds 2 gal., and your lamp holds 2 quarts, how many times can you fill your lamp from your can?

1.	2.	3.	4.
$7 + ? = 11$	$? + 4 = 12$	$5 + 5 = ?$	$12 - 2 = ?$
$5 + ? = 12$	$? + 5 = 11$	$6 + 4 = ?$	$10 - 2 = ?$
$4 + ? = 9$	$? + 3 = 10$	$9 + 3 = ?$	$8 - 2 = ?$
$6 + ? = 10$	$? + 7 = 9$	$7 + 5 = ?$	$6 - 2 = ?$
$8 + ? = 11$	$? + 9 = 12$	$2 + 4 = ?$	$4 - 2 = ?$

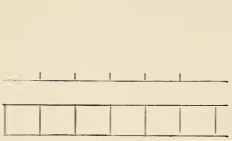
5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
7	4	5	5	9	6	6	4	1	8
0	3	3	0	1	4	3	1	2	0
4	0	2	4	0	1	0	2	3	1
1	1	1	2	2	0	2	3	4	3

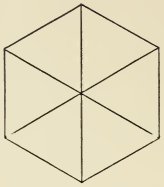
15.	16.	17.	18.
$12 - 4 = ?$	$11 - ? = 4$	$? - 4 = 8$	$7 - 4 = ?$
$9 - 7 = ?$	$10 - ? = 7$	$? - 6 = 5$	$6 - 3 = ?$
$7 - 5 = ?$	$9 - ? = 6$	$? - 7 = 2$	$5 - 4 = ?$
$11 - 6 = ?$	$8 - ? = 4$	$? - 9 = 1$	$8 - 3 = ?$
$8 - 2 = ?$	$7 - ? = 5$	$? - 11 = 1$	$9 - 6 = ?$

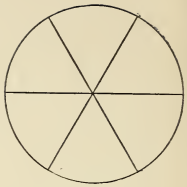
19.	20.	21.	22.
$7 + ? = 12$	$3 + ? = 12$	$5 + 6 = ?$	$5 + 7 = ?$
$12 - ? = 4$	$12 - ? = 1$	$8 + 4 = ?$	$12 - 9 = ?$
$4 + ? = 12$	$12 - ? = 8$	$9 + 3 = ?$	$12 - 10 = ?$
$12 - ? = 2$	$6 + ? = 12$	$4 + 8 = ?$	$7 + 4 = ?$

23.	24.	25.	26.
$1 \times 2 = ?$	$2 \times 1 = ?$	$2 \times 6 = ?$	$4 \times 1 = ?$
$1 \times 3 = ?$	$2 \times 2 = ?$	$3 \times 1 = ?$	$4 \times 2 = ?$
$1 \times 4 = ?$	$2 \times 3 = ?$	$3 \times 2 = ?$	$4 \times 3 = ?$
$1 \times 5 = ?$	$2 \times 4 = ?$	$3 \times 3 = ?$	$5 \times 1 = ?$

1. Five () and 4 () are —— ().
2. Seven () and 3 () are —— ().
3. 12 () less 4 () are —— ().
4. 4 () and 4 () are —— ().
5. Make a story about 7 and 3.
6. Make a story about 4 and 6.
7. Make a story about 2 and 4.
8. Make a story about 12 less 5.
9. Make a story about 10 less 5.
10. Make a story about 7 and 5.
11. Make a story about 4 and 3.
12. Make a story about 9 less 6.
13. Make a story about 8 less 3.
14. Make a story about 9 less 4.
15. 4 () and 6 () are —— ().
16. 10 () and 2 () are —— ().
17. 7 () and 2 () are —— ().
18. 6 () less 6 () are —— ().
19. 6 () and 5 () are —— ().
20. 9 () and 3 () are —— ().
21. 12 () less 8 () are —— ().
22. 8 () less 7 () are —— ().
23. 11 () less 2 () are —— ().
24. 4 () less 2 () are —— ().
25. 11 () and 1 () are —— ().
26. Ten from 12 leaves how many? 8 from 12?
27. 6 from 12 leaves how many? 4 from 12?
28. Eleven from 12 leaves how many? 9 from 12?
29. Seven from 12 leaves how many? 5 from 12?
30. Three from 12 leaves how many? 1 from 12?
31. What number is 7 less than 12?
32. What number is 5 less than 12?
33. What number is ½ of 12?
34. A half-dozen is how many less than 10?







1. Into how many parts is the line divided?
2. Into how many parts is the circle divided?
3. What is each part called?
4. Draw a line 6 inches long. Find $\frac{1}{6}$ of this line.
5. Draw a rectangle 3 inches long and 2 inches wide. Divide it into square inches. Mark off $\frac{1}{6}$ of it.
6. What is $\frac{1}{6}$ of 12?
7. What is $\frac{1}{3}$ of 12?
8. How much larger is $\frac{1}{3}$ of 12 than $\frac{1}{6}$ of 12?
9. How many months in $\frac{1}{6}$ of a year?
10. How many inches in $\frac{1}{6}$ of a foot?
11. How many eggs in $\frac{1}{6}$ of a dozen?
12. Draw a square, mark off $\frac{1}{6}$ of it.
13. Make 4 examples, using $\frac{1}{6}$ in each.
14. How many are $\frac{1}{6}$ of 12, $\frac{1}{3}$ of 12, and $\frac{1}{4}$ of 12?
15. Which is larger, $\frac{1}{2}$ of an apple or $\frac{1}{6}$ of it?
16. Which is larger, $\frac{1}{3}$ of an apple or $\frac{1}{4}$ of it?
17. By drawing lines and dividing them into equal parts, show the answers to the 15th and 16th questions.
18. If $\frac{1}{6}$ of a pound of raisins is worth 2 cents, what are $\frac{2}{6}$ of a pound worth?
19. If $\frac{1}{6}$ of a pound of butter is worth 4 cents, what are $\frac{3}{6}$ of a pound worth?
20. Mary is 12 years old, and her brother is $\frac{1}{6}$ as old; how old is her brother?
21. What is the distance round the outside of a rectangular table that is 3 feet long and 2 feet wide?

1. If 1 pencil costs 2 cents, how many pencils can you buy for 12 cents?

00 00 00 00 00 00
1 1 1 1 1 1 = 6 pencils.

Illustrate each of the following examples:

2. If 1 apple costs 2 cents, how many apples can you buy for 10 cents?

3. If one box of butter costs 3 dollars, how many boxes of butter can you buy for 9 dollars?

4. If silk costs 3 dollars a yard, how many yards can you buy for 12 dollars?

5. If one peach costs 4 cents, how many peaches can you buy for 12 cents?

6. If eggs are 2 cents each, how much will $\frac{1}{2}$ of a dozen eggs cost?

7. If one orange costs 3 cents, how much will $\frac{1}{3}$ of a dozen oranges cost?

8. If one lamp costs 2 dollars, how many lamps can you buy for 8 dollars?

9. If I pay a cent for 3 little flags, how many flags can I buy for 9 cents?

10. How many 2-cent postage stamps can I buy for a dime?

11. At 2 dimes apiece, how many books can I buy for 8 dimes?

12. At 3 cents each, how many melons can I buy for 12 cents?

13. If a pint of berries costs 4 cents, what will 1 quart and 1 pint cost?

14. If 1 apple costs 5 cents, 2 apples will cost how many cents?

15. If 1 apple costs 3 cents, what will 3 apples cost?

16. If 1 apple costs 4 cents, two apples will cost how many cents?

1. 2 gills are what part of 1 quart?

2. Draw a square, and divide it into 4 triangles by drawing the diagonals. Cross out $\frac{1}{4}$ of the triangles. Cross out $\frac{1}{2}$ of them. How many triangles have you crossed out?

3. $\frac{1}{4}$ and $\frac{1}{4}$ are $\frac{?}{4}$. $\frac{2}{4}$ less $\frac{1}{4}$ are $\frac{?}{4}$.

4. $\frac{1}{3}$ and $\frac{1}{3}$ are $\frac{?}{3}$. $\frac{2}{3}$ less $\frac{1}{3}$ are $\frac{?}{3}$.

5. $\frac{1}{2}$ and $\frac{1}{2}$ are $\frac{?}{2}$. $\frac{2}{2}$ less $\frac{1}{2}$ are $\frac{?}{2}$.

6. $\frac{1}{2}$ of 4 equals what? 2 is $\frac{1}{2}$ of what?

7. $\frac{1}{2}$ of 1 equals what? 3 is $\frac{1}{2}$ of what?

8. $\frac{1}{3}$ of 6 equals what? 2 is $\frac{1}{3}$ of what?

9. $\frac{1}{3}$ of 1 equals what? 2 is $\frac{1}{4}$ of what?

10. $\frac{1}{6}$ of 12 equals what? 2 is $\frac{1}{6}$ of what?

11. Write the names of the winter months.

12. Write the abbreviations of the fall months.

13. Draw 2 rectangles whose perimeters shall be 12 inches.

14. How many quarts make a gallon?

15. How many feet make a yard?

16. How many things make a dozen?

17. Name 5 things that are sold by the quart or gallon.

18. Make a story for the class to answer about each one of the things you named in answering the 17th question.

19. Write the names of the days of the week.

20. Draw a vertical line 8 inches long.

21. Draw a horizontal line 6 inches long.

22. What kind of an angle is formed if you use a vertical and a horizontal line?

23. Find the area of a rectangle that is 6 feet long and 2 feet wide.

24. Cut out of paper a half-inch square, and name it A. Cut a rectangle 2 inches long and 1 inch wide, and name it B. Fold B until it is the same size as A. How many times larger is it?



10 + 3 = 13

1.

3 + 10 or 10 + 3 = 13
4 + 9 or 9 + 4 = 13
5 + 8 or 8 + 5 = 13
6 + 7 or 7 + 6 = 13

2.

X = 10
XI = 11
XII = 12
XIII = 13

3.

6 + 7 = ?
7 + 3 = ?
6 + 2 = ?

4.

12 − 4 = ?
13 − 9 = ?
11 − 5 = ?
9 − 7 = ?
10 − 6 = ?

5.

13 − 7 = ?
13 − 11 = ?
13 − 9 = ?
13 − 12 = ?
13 − 8 = ?

6.

13 − ? = 4
12 − ? = 7
11 − ? = 8
10 − ? = 3
9 − ? = 4

7.

? − 6 = 7
? − 5 = 7
? − 8 = 4
? − 9 = 1
? − 11 = 2

8.

13 − 2 = ?
13 − 3 = ?
13 − 4 = ?
13 − 5 = ?
13 − 6 = ?

9.

12 ÷ 6 = ?
12 ÷ 4 = ?
12 ÷ 3 = ?
12 ÷ 2 = ?
10 ÷ 5 = ?

10.

9 + 4 = ?
8 + 3 = ?
6 + 7 = ?
5 + 6 = ?
7 + 4 = ?

11.	3)13	6)12	3)12	2)3	2)8
12.	6)13	2)12	4)9	2)5	2)9
13.	5)10	4)12	3)7	2)6	2)10
14.	4)13	3)9	7)7	2)7	2)11

15.	**16.**	**17.**	**18.**	**19.**	**20.**	**21.**	**22.**	**23.**	**24.**
7	1	1	7	2	5	4	3	1	4
4	3	0	3	4	5	5	5	9	6
0	2	3	2	5	2	3	3	0	2
2	4	5	1	2	1	0	2	3	1

1. Sight subtraction:

9	12	11	13	8	9	11	10	10	13
7	7	8	8	7	8	7	8	7	9

2.

9	5	4	7	9	8	9	12	11	9
1	2	3	4	5	6	2	6	5	4

3.

10	12	12	8	13	6	12	11	9	7
9	3	9	4	6	2	5	3	6	5

4.

12	13	12	10	13	12	11	9	7	8
8	7	4	5	5	6	6	3	2	4

5. What have you seen measured with a yard measure?

6. What have you seen at home that was 1 yard long?

7. Find something in the room that is 1 yard long.

8. Draw a horizontal line that is one yard long. Do not use a ruler.

9. Measure your line with a foot rule, and see how many feet you have. How many should you have in 1 yard?

10. If a table is 8 feet long and 5 feet wide, how many feet is it ½ way around the table?

11. Bessie had 8 cents and Belle had 5 cents. Bessie gave Belle 1 cent; how many cents had each then?

12. Make a story about 13 eggs.

13. Make a story about 13 boys.

14. Make a story about 13 birds.

15. Make a story about 13 cherries.

16. 13 months are how many months more than a year?

17. 13 inches are how many inches more than 1 foot?

18. What number must you put with 8 to make 13?

19. 13 is how many more than 7?

1. Draw an oblong; cross off $\frac{1}{6}$ of it?

2. Draw a square; cross off $\frac{1}{2}$ of it.

3. Take 12 cubes, and build a wall 4 blocks long and 3 blocks high. Take away $\frac{1}{4}$ of your wall.

4. How many are 9 less 5? 11 less 7? 13 less 9?

5. If your mother gives you a dime and a 3-cent piece to buy 4 three-cent oranges, how much change will you bring her?

6. Charles has 13 apples; if he gives each of his 3 brothers 3 apples, how many does he have left himself?

7. If pop-corn is 5 cents a pint, how many quarts can you buy for 13 cents, and how much money will you have left?

8. Fred is 13 years old, and his sister is $\frac{1}{2}$ as old; how old is his sister?

9. Monday, Michael earned $\frac{1}{4}$ of 12 cents; Tuesday he earned $\frac{1}{2}$ of 12 cents; Wednesday he earned $\frac{1}{3}$ of 12 cents. How much did he earn during the three days?

10. If Mary has 7 books, and her father should give her 6, how many books would she then have?

11. Charles walked 4 miles and rode 9; how many miles did he travel?

12. Mary gave her teacher 5 pinks and 7 roses; how many flowers did she give her?

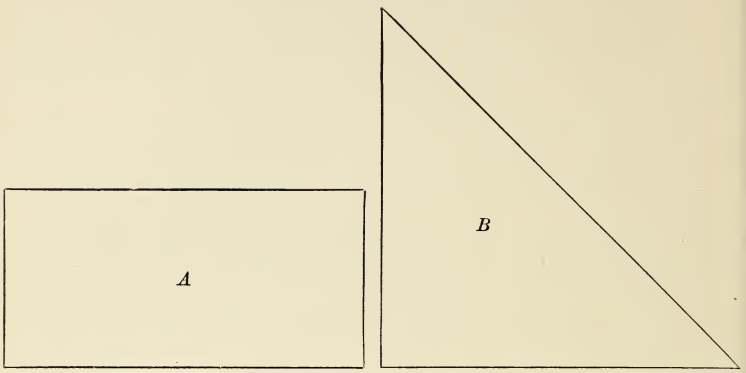
13. Harry caught 5 squirrels, and Thomas caught 8; how many squirrels did both boys catch?

14. Joseph had 7 walnuts, and John gave him 6; how many had he then?

15. William picked 7 quarts of cherries, and his brother 6 quarts; how many quarts did both pick?

16. In a certain class there are 9 girls and 6 boys; how many more girls than boys in the class?

17. A man had 13 cows, and sold 4 of them; how many did he then have?



1. Take a 2-inch square, and fold it to the shape and size of Fig. *A*.

2. Take another square, and fold it to the shape and size of Fig. *B*.

3. Write five things in which these figures are alike.

4. See if you can write five differences.

5. Write the name of *A*.

6. Write the name of *B*.

7. How can you prove that *A* and *B* are alike in area? Both are halves of what?

8. What angle of *A* equals what angle of *B*?

9. What sides of *A* equal what sides of *B*?

10. Both have a pair of what kind of lines?

11. How many right angles has each?

12. How many lines are there in the boundary of each surface?

13. Bring to school to-morrow 5 oblongs and 5 right-triangles.

14. See if you can find 5 objects like each of these forms on your way home from school.

1. 13 cents are how much more than a dime?

2. 13 feet are how much more than 3 yards?

3. 13 quarts are how much more than 3 gallons?

4. What two numbers multiplied together make 12?

5. Draw 5 squares, each 2 inches on a side. Arrange them so that there shall be one center square with the other four touching it at each of its corners.

6. In five quarts there are how many pints?

7. In 3 gallons and a quart there are how many quarts?

8. A quart is how many times as much as a pint?

9. A quart is how many times as much as a gill?

10. A line is 3 yards and 2 feet long. How many feet long is it?

11. If you find 4 eggs every day, how many days will it take you to find a dozen eggs?

12. At 3 cents a pint, what will 12 gills of milk cost?

13. If you study 2 hours each school day, how many hours do you study in a week?

14. Four times 3 are how many less than 13?

15. To 5 add 6, take away 3, divide by 2, add 7, take away 1, divide by 5, add 1, multiply by 3, name your result.

16. Multiply 2 by 3, multiply by 2, divide by 4, add 8, take away 1, add 2, divide by 6, add 2, write your result.

17. 13 minus 3 times 3 are how many less than 2 times 6?

18. How many times is 5 contained in 13 less $\frac{1}{2}$ of 6?

19. Multiply 6 by 2, add 1, take away 3, divide by 2, take away 1, multiply by 3, add $\frac{1}{3}$ of 5, take away 3, write your result.

20. A long ladder has 13 steps, and a short one has 6; how many more steps has the long ladder than the short one?

21. A boy had 12 cents, and gave 5 of them for an orange, and 4 of them for a pear; how many cents did he have left?

Tell a story about each, and then fill the blanks with the right words. Illustration: Mary had 8 peaches, and gave her brothers and sisters 6, so she had 2 left; 8 peaches less 6 peaches are 2 peaches.

1. Eight () less six () are —— ().
2. Nine () and four () are —— ().
3. Thirteen () less nine () are —— ().
4. Seven () and six () are —— ().
5. Thirteen () less ten () are —— ().
6. Twelve () less eight () are —— ().
7. Eight () and five () are —— ().
8. Six () and three () are —— ().
9. Five () and seven () are —— ().
10. Eleven () less five () are —— ().
11. Twelve () less six () are —— ().
12. Eight () and three () are —— ().
13. Four () and seven () are —— ().
14. Three () and nine () are —— ().
15. Five () and five () are —— ().
16. Eleven () less four () are —— ().
17. Twelve () less seven () are —— ().
18. Nine () less three () are —— ().
19. Nine () and three () are —— ().
20. Eight () less three () are —— ().
21. Thirteen () less seven () are —— ().
22. Six () and five () are —— ().
23. Seven () and three () are —— ().
24. Twelve () less eight () are —— ().
25. Eleven () less nine () are —— ().
26. Ten () and three () are —— ().
27. Ten () less six () are —— ().
28. Twelve () less four () are —— ().
29. Six () and six () are —— ().
30. Eight () and four () are —— ().

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1	3	2	3	4	5	2	2	6	7
4	2	3	2	1	1	2	3	5	4
2	1	2	3	2	3	4	4	2	1

11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
2	4	2	3	1	2	2	1	2	3
1	1	2	1	1	2	1	2	2	5
2	2	1	2	4	4	6	3	5	3
3	2	4	4	6	4	2	4	3	2

21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
1	1	1	1	3	3	1	3	4	5
3	1	0	5	2	2	4	6	1	0
1	4	2	0	4	5	4	3	0	1
5	3	6	5	2	1	2	0	6	6
2	2	1	2	1	2	2	1	2	1

31.	32.	33.	34.
$12 - 3 = ?$	$13 - 9 = ?$	$10 - 4 = ?$	$12 - 4 = ?$
$13 - 4 = ?$	$9 - 6 = ?$	$12 - 7 = ?$	$13 - 5 = ?$
$7 - 2 = ?$	$12 - 5 = ?$	$13 - 6 = ?$	$11 - 7 = ?$
$12 - 6 = ?$	$13 - 3 = ?$	$13 - 8 = ?$	$13 - 6 = ?$

35.	36.	37.	38.
$2 \times 2 = ?$	$3 \times 3 = ?$	$4 \times 3 = ?$	$2 \times 3 = ?$
$2 \times 6 = ?$	$3 \times 1 = ?$	$4 \times 1 = ?$	$2 \times 4 = ?$
$5 \times 2 = ?$	$3 \times 4 = ?$	$4 \times 2 = ?$	$6 \times 2 = ?$

39.	40.	41.	42.
$12 \div 2 = ?$	$13 \div 2 = ?$	$10 \div 3 = ?$	$13 \div 4 = ?$
$10 \div 2 = ?$	$11 \div 2 = ?$	$12 \div 3 = ?$	$13 \div 3 = ?$
$9 \div 2 = ?$	$6 \div 2 = ?$	$12 \div 6 = ?$	$9 \div 3 = ?$

10 cents make a dime.
10 dimes make a dollar.
¢ or ct. stands for cent or cents.
$ stands for dollar or dollars.

1. Appoint a store-keeper; when the store-keeper makes a mistake in change choose a new one.

2. Let each pupil buy something and count his change. Let each pupil decide for himself what he will buy.

3. Charles may buy a pen holder for 8 cents.

4. Mary may buy a quart of milk at 4 cents a pint.

5. Bessie may buy 5 pencils at 2 cents each.

6. Clara may buy a spool of thread for 5 cents, and 2 papers of pins at 4 cents a paper.

7. George may buy 6 pints of milk at 2 cents a pint.

8. John may buy 12 gills of berries at 4 cents a pint.

9. Belle may buy 4 oranges at 3 cents each, and a stick of candy for 1 cent.

10. Dick may buy 5 2-cent stamps and 2 1-cent stamps.

11. Clara may buy 3 feet of tape at 6 cents a yard.

12. Julia may buy $4\frac{1}{2}$ yards of ribbon at 2 cents a yard.

13. Nellie may buy $3\frac{1}{3}$ yards of braid at 3 cents a yard.

14. Tom may buy 5 cents' worth of peaches and apples. The peaches are marked, "Four for 5 cents," and the apples, "Six for 5 cents." How many of each can Tom buy?

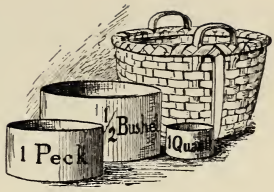
15. Dick may buy 3 cents' worth of candy, 4 cents' worth of paper, and a 5-cent ball.

16. Rose may buy 6 yards of tape, when 3 yards cost 6 cents.

17. Harry may buy a dozen lemons, when 6 lemons cost 5 cents.

18. Frank may buy $\frac{1}{4}$ of a dozen apples at 3 cents each.

NOTE. — Give the pupils toy money, but nothing larger than dimes.



Here is a picture of a quart, a peck, a half-bushel measure, and a bushel basket.

1. Take the quart measure, and fill it with sawdust. Pour it into the next larger measure, the peck. Find out how many quarts will fill the peck.

2. In the same way find out how many pecks will fill the half-bushel. Then how many will fill the bushel.

3. Copy on your paper, and fill blanks:

— pints make 1 quart.
— quarts make 1 peck (pk.).
— pecks make 1 bushel (bu.).

4. Learn this table.

5. Write the abbreviations for pint and quart.

6. Have you ever seen these measures before?

7. What different things are measured by them?

8. If 4 bushels of wheat cost 8 dollars, what will 1 bushel cost?

9. How many quarts of corn will you have, if you have 1 peck and 2 quarts?

10. How many bushels in 12 pecks?

11. How many pecks in 12 quarts?

12. At 2 dollars a peck, what will a bushel of grass-seed cost?

13. If 3 bushels of oranges cost 12 dollars, what will 1 peck cost?

14. If 8 bushels of apples cost 8 dollars, what will half a bushel cost?

15. If 5 bushels of apples cost 10 dollars, what will half a bushel cost?

16. How many bushels in 13 pecks? How many quarts remaining?

1. Bring to school four 4-inch squares.

2. Measure your squares to find out if they are perfect squares.

3. Place 1 square on your desk parallel with front edge.

4. Put your finger on the upper edge of the square.

5. Put your finger on the left-hand edge.

6. Put your finger on the lower edge.

7. Put your finger on the right-hand edge.

8. Put your finger on the upper right-hand corner.

9. Put your finger on the lower left-hand corner.

10. Put your finger on the lower right-hand corner.

11. Put your finger on the upper left-hand corner.

12. Place the lower left-hand corner upon the upper right-hand corner. Crease the paper and unfold it.

13. Can you see the crease? What name can we give to such a line?

14. We call such a line a diagonal. It means *through the angles.*

15. Write this new word on your paper.

16. Take another square, and make its diagonal in the same way. Do not lift the square. Be sure your diagonal runs through the same angles as in the first square.

17. Take a third square. See if you can fold it so as to make a diagonal that joins the upper right-hand corner with the lower left-hand corner.

18. Take your fourth square, and fold it so as to make both diagonals.

19. Draw a 4-inch square. Draw both diagonals.

20. Draw a rectangle 4 inches long and 2 inches wide. Draw its diagonals.

21. Make 4 squares or oblongs, and draw two diagonals in each.

NOTE. — This lesson is a review of work done in the kindergarten or first grade. If your pupils do not need dictation work of this kind, omit it.



10 + 4 = 14

1.

10 + 4 or 4 + 10 = 14
9 + 5 or 5 + 9 = 14
8 + 6 or 6 + 8 = 14
7 + 7 = 14

2.

XIV = 14

3.	**4.**	**5.**	**6.**
6 + 7 = ?	4 + 8 = ?	? + 7 = 14	? + 5 = 14
5 + 8 = ?	6 + 5 = ?	? + 9 = 14	? + 10 = 14
7 + 7 = ?	6 + 6 = ?	? + 8 = 14	? + 13 = 14
9 + 5 = ?	5 + 5 = ?	? + 4 = 14	? + 11 = 14
	11 + 3 = ?	? + 6 = 14	? + 10 = 14

7.	**8.**	**9.**	**10.**
14 − 7 = ?	14 − 11 = ?	13 − 8 = ?	10 − 6 = ?
14 − 9 = ?	14 − 5 = ?	12 − 9 = ?	11 − 7 = ?
14 − 10 = ?	14 − 12 = ?	11 − 6 = ?	12 − 8 = ?
14 − 6 = ?	14 − 8 = ?	13 − 7 = ?	11 − 5 = ?
14 − 4 = ?	14 − 3 = ?	9 − 6 = ?	12 − 6 = ?

11.	**12.**	**13.**	**14.**
2 × 2 = ?	3 × 3 = ?	2 × 1 = ?	6 × 1 = ?
4 × 2 = ?	3 × 4 = ?	3 × 1 = ?	4 × 3 = ?
6 × 2 = ?	3 × 2 = ?	4 × 1 = ?	2 × 7 = ?
7 × 2 = ?	5 × 2 = ?	5 × 1 = ?	2 × 4 = ?

15.	**16.**	**17.**	**18.**
14 ÷ 7 = ?	12 ÷ 3 = ?	4 ÷ 4 = ?	13 ÷ 2 = ?
14 ÷ 2 = ?	12 ÷ 2 = ?	6 ÷ 6 = ?	13 ÷ 4 = ?
12 ÷ 6 = ?	9 ÷ 3 = ?	8 ÷ 8 = ?	13 ÷ 6 = ?
12 ÷ 4 = ?	10 ÷ 5 = ?	9 ÷ 9 = ?	13 ÷ 3 = ?

The teacher should provide *many* circles, and cut them into halves, thirds, etc. Let the pupils perform all examples in fractions objectively.

1.	2.	3.	4.
$\frac{1}{3}$ of 3 = ?	$\frac{1}{2}$ of 1 = ?	$\frac{1}{4}$ of 1 = ?	$\frac{1}{6}$ of 1 = ?
$\frac{1}{3}$ of 1 = ?	$\frac{1}{2}$ of 5 = ?	$\frac{1}{4}$ of 4 = ?	$\frac{1}{6}$ of 6 = ?
$\frac{1}{3}$ of 4 = ?	$\frac{1}{2}$ of 7 = ?	$\frac{1}{4}$ of 5 = ?	$\frac{1}{6}$ of 7 = ?
$\frac{1}{3}$ of 6 = ?	$\frac{1}{2}$ of 9 = ?	$\frac{1}{4}$ of 8 = ?	$\frac{1}{6}$ of 12 = ?

5.	6.	7.	8.
$\frac{1}{3}$ of 7 = ?	$\frac{1}{2}$ of 2 = ?	$\frac{1}{3}$ of 13 = ?	$\frac{1}{2} + \frac{1}{2}$ = ?
$\frac{1}{3}$ of 9 = ?	$\frac{1}{2}$ of 4 = ?	$\frac{1}{6}$ of 13 = ?	$\frac{1}{3} + \frac{1}{3}$ = ?
$\frac{1}{3}$ of 10 = ?	$\frac{1}{2}$ of 6 = ?	$\frac{1}{2}$ of 10 = ?	$\frac{1}{4} + \frac{1}{4}$ = ?
$\frac{1}{3}$ of 12 = ?	$\frac{1}{2}$ of 8 = ?	$\frac{1}{2}$ of 11 = ?	$\frac{1}{6} + \frac{1}{6}$ = ?

9.	10.	11.	12.
$\frac{2}{3} - \frac{1}{3}$ = ?	$\frac{3}{4} - \frac{1}{4}$ = ?	$1 - \frac{1}{4}$ = ?	$\frac{2}{6} - \frac{1}{6}$ = ?
$\frac{3}{3} - \frac{1}{3}$ = ?	$\frac{2}{4} - \frac{1}{4}$ = ?	$1 - \frac{1}{2}$ = ?	$\frac{3}{6} - \frac{1}{6}$ = ?
$\frac{2}{2} - \frac{1}{2}$ = ?	$\frac{1}{4} - \frac{1}{4}$ = ?	$1 - \frac{1}{6}$ = ?	$\frac{4}{6} - \frac{1}{6}$ = ?
$\frac{4}{4} - \frac{1}{4}$ = ?	$\frac{1}{2} - \frac{1}{2}$ = ?	$1 - \frac{1}{3}$ = ?	$\frac{1}{6} - \frac{1}{6}$ = ?

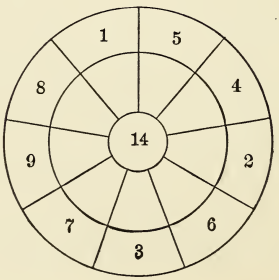
13.	14.	15.	16.
$\frac{2}{4} + \frac{2}{4}$ = ?	$\frac{1}{4} + \frac{3}{4}$ = ?	$1 - \frac{3}{4}$ = ?	$\frac{2}{6} + \frac{1}{6}$ = ?
$\frac{2}{6} + \frac{2}{6}$ = ?	$\frac{1}{4} + \frac{2}{4}$ = ?	$1 - \frac{2}{4}$ = ?	$\frac{3}{6} + \frac{1}{6}$ = ?
$\frac{1}{3} + \frac{2}{3}$ = ?	$\frac{3}{6} + \frac{3}{6}$ = ?	$1 - \frac{3}{6}$ = ?	$\frac{4}{6} + \frac{1}{6}$ = ?
$\frac{4}{6} + \frac{2}{6}$ = ?	$\frac{3}{6} + \frac{2}{6}$ = ?	$1 - \frac{5}{6}$ = ?	$\frac{5}{6} + \frac{1}{6}$ = ?

17.	18.	19.
2 is $\frac{1}{3}$ of ?	2 is $\frac{1}{6}$ of ?	3 is $\frac{1}{2}$ of ?
4 is $\frac{1}{3}$ of ?	3 is $\frac{1}{4}$ of ?	1 is $\frac{1}{2}$ of ?
5 is $\frac{1}{2}$ of ?	3 is $\frac{1}{3}$ of ?	1 is $\frac{1}{6}$ of ?
7 is $\frac{1}{2}$ of ?	4 is $\frac{1}{2}$ of ?	1 is $\frac{1}{4}$ of ?

1. Cut out five 2-inch squares.
2. Name them A, B, C, D, E.
3. Place A in the center of your desk.
4. Place B so that its lower edge shall touch the upper edge of A.
5. Place C so that its left-hand edge shall touch the right-hand edge of A.
6. Place D so that its upper edge shall touch the lower edge of A.
7. Place E so that its right-hand edge shall touch the left-hand edge of A.
8. How many inches is it from the upper left-hand corner of B to lower left-hand corner of D in a straight line?
9. How many inches is it between the same corners if you count on the outside and pass to the left?
10. How far if you pass to the right between the same corners?
11. How many inches is it from the upper right-hand corner of C to the lower left-hand corner of E, going either to the left or right?
12. Place C in the center of your desk.
13. Place A so that its lower left-hand corner shall touch the upper right-hand corner of C.
14. Place E so that its upper right-hand corner shall touch the lower left-hand corner of C.
15. Place B so that its upper left-hand corner shall touch the lower right-hand corner of C.
16. Place D so that its lower right-hand corner shall touch the upper left-hand corner of C.
17. Draw diagonals in each of the squares.
18. Find the perimeter of a rectangle 4 inches long and 2 inches wide.
19. Find the area of a rectangle 7 inches long and 2 inches wide.

DRILL TABLE FOR SUBTRACTION.

1.	12	11	9	13	3	8	13	7	10	12	
	1	2	5	7	1	1	8	5	9	2	
2.	6	12	7	14	9	14	14	9	9	10	
	2	6	5	8	4	2	5	8	6	3	
3.	11	6	11	6	9	14	14	14	11	6	
	3	3	6	5	2	9	2	8	7	2	
4.	11	12	14	14	5	14	12	6	11	14	
	8	4	6	7	2	4	7	6	5	5	
5.	13	12	14	10	10	13	9	14	12	11	
	2	3	4	2	5	6	1	8	7	5	
6.	8	13	10	10	7	12	14	12	14	10	
	5	4	7	3	2	8	2	9	1	4	
7.	14	13	9	13	7	8	11	7	12	12	11
	3	5	3	9	7	7	3	4	5	4	4



Place this wheel on the blackboard. Substitute any number for 14 for additional practice.

1. In $3\frac{1}{2}$ gal. how many quarts?

2. In $1\frac{1}{2}$ gal. how many pints?

3. At 1 cent a gill, a quart and a pint of milk will cost how much?

4. A room is 4 yards and 1 foot long; how many feet long is it?

5. How many legs have 2 flies and a bird?

6. What will 2 quarts of vinegar cost at 7 cents a quart?

7. If a can holds 3 gal., how many quarts must you pour in it before the can is full?

8. Draw a rectangle $\frac{1}{2}$ of a foot long and $\frac{1}{3}$ of a foot wide.

9. In 2 weeks there were 5 stormy days. How many pleasant days were there?

10. How many cents in 4 two-cent pieces and a five-cent piece?

11. If you spend 3 cents for candy, and give the storekeeper a dime, how much change will you get back?

12. Make 14 vertical parallel lines.

13. Make 14 horizontal parallel lines.

14. Make as many pairs of adjacent lines as you can and have only 14 lines.

15. Make as many pairs of perpendicular lines as you can, and have only 14 lines.

16. Among how many playmates can you divide 14 apples, and how many apples will you have left if you give each 2 apples? If you give each 3 apples? 4 apples? 5 apples? 6 apples? 7 apples?

17. Add 8 and 5, subtract 6, multiply by 2, take away 5, divide by 3, multiply by 2, subtract 4, subtract 1, multiply by 7, subtract 3; write your result.

18. A cooper made 14 buckets, and sold 5 of them; how many buckets had he left?

19. Sarah had 14 apples, and gave $\frac{1}{2}$ of them to Jane; how many apples did Jane receive?

1. Copy and learn:

7 days make 1 week. 12 months make 1 year.

2. How many days in 2 weeks?
3. How many months in $\frac{1}{4}$ of a year?
4. How many months in $\frac{1}{2}$ of a year?
5. How many seasons in a year?
6. How many months in a season?
7. Name the seasons.
8. Name the months in each season.
9. 6 months is what part of a year?
10. 4 months is what part of a year?
11. 3 months is what part of a year?
12. 2 months is what part of a year?
13. How many months in $\frac{1}{3}$ of a year?
14. How many months in $\frac{1}{6}$ of a year?
15. If you go to school 10 months every year, how many months of vacation have you?
16. 14 months are how many months more than a year?
17. If a man earns 12 dollars a week, how much is that for every working day?
18. If a boy earns 12 dollars a month, how much will he earn in $\frac{1}{2}$ a month?
19. Write the name of to-day, and of every day for a week.
20. Write the name of this month, and of every month from now till the end of the year.
21. How many months from March 1 to August 1?
22. How many months from June 1, 1894, to Feb. 1, 1895?
23. How many days is it from Wednesday of this week till Friday of next week?
24. In which month is Christmas?
25. In which month is Washington's birthday?
26. In which month is Memorial Day?
27. In which month is Independence Day?






1. Into how many equal parts is each of these figures divided?
2. What is each part called?
3. Draw a line 8 inches long; mark off $\frac{1}{8}$ of it.
4. How many inches in the piece you cut off?
5. Draw a rectangle 8 inches long and 1 inch wide; divide it into square inches. Mark off $\frac{1}{8}$ of it.
6. Draw a rectangle that is 4 inches long and 2 inches wide; divide it into square inches, and mark off $\frac{1}{8}$ of it.
7. What part of 8 squares is 1 square?
8. What part of 8 inches is 1 inch?
9. What part of 8 apples is 1 apple?
10. What is $\frac{1}{8}$ of 8? $\frac{2}{8}$ of 8? $\frac{6}{8}$ of 8?
11. How many eighths are $\frac{6}{8} - \frac{4}{8}$?
12. How many eighths are in $\frac{1}{2}$?
13. $\frac{1}{4}$ is equal to how many eighths?
14. $\frac{6}{8}$ are equal to how many fourths?
15. $\frac{4}{8}$ are equal to how many fourths?
16. Among how many children can you divide an orange if you give each child $\frac{2}{8}$ of it?
17. Draw figures to illustrate each of the following:

$\frac{1}{8} + \frac{1}{8} = ?$	$\frac{1}{8} + \frac{5}{8} = ?$	$\frac{2}{8} + \frac{3}{8} = ?$	$\frac{3}{8} + \frac{3}{8} = ?$
$\frac{1}{8} + \frac{2}{8} = ?$	$\frac{1}{8} + \frac{6}{8} = ?$	$\frac{2}{8} + \frac{4}{8} = ?$	$\frac{3}{8} + \frac{4}{8} = ?$
$\frac{1}{8} + \frac{3}{8} = ?$	$\frac{1}{8} + \frac{7}{8} = ?$	$\frac{2}{8} + \frac{5}{8} = ?$	$\frac{3}{8} + \frac{5}{8} = ?$
$\frac{1}{8} + \frac{4}{8} = ?$	$\frac{2}{8} + \frac{2}{8} = ?$	$\frac{2}{8} + \frac{6}{8} = ?$	$\frac{4}{8} + \frac{4}{8} = ?$

18.

$\frac{8}{8} - \frac{1}{8} = ?$	$\frac{6}{8} - \frac{2}{8} = ?$	$\frac{8}{8} - \frac{5}{8} = ?$	$\frac{7}{8} - \frac{5}{8} = ?$
$\frac{8}{8} - \frac{6}{8} = ?$	$\frac{8}{8} - \frac{5}{8} = ?$	$\frac{7}{8} - \frac{3}{8} = ?$	$\frac{7}{8} - \frac{2}{8} = ?$
$\frac{8}{8} - \frac{4}{8} = ?$	$\frac{4}{8} - \frac{2}{8} = ?$	$\frac{6}{8} - \frac{3}{8} = ?$	$\frac{6}{8} - \frac{5}{8} = ?$
$\frac{8}{8} - \frac{3}{8} = ?$	$\frac{8}{8} - \frac{7}{8} = ?$	$\frac{5}{8} - \frac{2}{8} = ?$	$\frac{5}{8} - \frac{3}{8} = ?$

SIGHT ADDITION.

1.	1	2	3	4	5	6	7	8	9	10
	1	1	1	1	1	1	1	1	1	1
2.	1	2	3	4	5	6	7	8	9	10
	2	2	2	2	2	2	2	2	2	2
3.	1	2	3	4	5	6	7	8	9	10
	3	3	3	3	3	3	3	3	3	3
4.	1	2	3	4	5	6	7	8	9	10
	4	4	4	4	4	4	4	4	4	4
5.	1	2	3	4	5	6	7	8	9	1
	5	5	5	5	5	5	5	5	5	6
6.	2	3	4	5	6	7	8	1	2	3
	6	6	6	6	6	6	6	7	7	7
7.	4	5	6	7	1	2	3	4	5	6
	7	7	7	7	8	8	8	8	8	8
8.	1	2	3	4	5	1	2	3	4	1
	9	9	9	9	9	10	10	10	10	11
9.	4	6	5	4	3	4	9	6	5	4
	3	7	5	6	3	4	1	4	7	4
	5	1	4	3	3	5	4	3	2	4
10.	3	2	3	5	4	7	3	5	9	7
	5	9	8	6	7	5	9	7	4	6
	6	2	3	2	3	2	1	1	1	1

1. Emily's dress cost 13 dollars, and her hat 3 dollars; how much more did the dress cost than the hat?

2. Mary has 12 raisins; if she eats 4 of them, how many will she have left?

3. Mr. Smith has 13 hogs; if he sells 4 of them to a drover, how many will he have left?

4. Alice had 14 figures on her slate, and then erased 5 of them; how many figures were left?

5. Jane is 14 years old, and her brother is 6 years younger; how old is her brother?

6. Alice is 7 years old, and her brother is 7 years older; how old is her brother?

7. Mary is 14 years old, and Kate is 8; what is the difference between their ages?

8. Two men start at the same time from 2 towns, and walk toward each other. One walks 4 miles an hour, and the other 3 miles an hour. If they meet in 2 hours, how far apart are the 2 towns?

9. Two men start at the same place, and travel the same way. One travels 2 miles an hour, the other 4 miles an hour; how far apart will they be in 1 hour? In 4 hours?

10. If 3 men can do a piece of work in 2 days, how many days will it take 1 man to do it?

11. Two men start from the same place, and travel different ways, one 2 miles an hour, the other 3 miles an hour. How far apart will they be in 1 hour? In 2 hours?

12. If 1 orange is worth as much as 3 apples, how many apples are 4 oranges worth?

13. George was sent to the store to buy 6 skeins of black thread; if each skein cost 2 cents, how much must George pay?

14. If peaches are 3 cents each, how much will 4 cost?

15. Write the abbreviations for gallon, quart, pint, gill.

16. Write the abbreviations for the days of the week.

1. Two boys, James and Robert, each bought 7 marbles. James gave Robert 4 of his; how many had each then?

2. If you had 10 cents, and your father should give you 3 more, and then you should buy 10 marbles at the rate of 2 for a cent, how much money would you have left?

3. In a school 5 pupils sit in the first row, 5 in the second, and 4 in the third; how many are there in the 3 rows?

4. James sold 2 quarts of berries at 5 cents a quart, and spent 2 cents for ginger-snaps. How much had he left?

5. 14 is how many times 2? 7? 14?

6. 12 is how many times 2? 3? 4? 6?

7. 10 is how many times 10? 5? 2?

8. If 2 men can cut a piece of wheat in 4 days, how many days will it take 1 man to cut it?

9. How much will 6 eggs cost at 14 cents a dozen?

10. A man owed me 14 dollars, and paid me all but 6 dollars; how many dollars did he pay me?

11. John bought 3 tops for 6 cents, and James bought 9 tops for 8 cents. How many tops did they both buy? How many cents did they pay?

12. Seven and seven are how many?

13. Five and nine are how many?

14. Six and eight are how many?

15. Frank gave 3 cents for an orange, and had 10 cents left. How much did he have before he bought the orange?

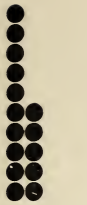
16. Lewis bought a watch for 8 dollars, and sold it for 10 dollars; how much did he gain?

17. Mr. Day bought a barrel of flour for 5 dollars, and sold it for 2 dollars more than he gave for it. For how much did he sell it?

18. In 14 there are how many sevens?

19. In 14 there are how many 3's and what remainder?

20. In 14 there are how many 4's and what remainder?



10 + 5 = 15

$5 + 10 = 15$, or $10 + 5 = 15$ XV = 15
$6 + 9 = 15$, or $9 + 6 = 15$
$7 + 8 = 15$, or $8 + 7 = 15$

1.	2.	3.	4.
$12 + 3 = ?$	$7 + 6 = ?$	$6 + 4 = ?$	$10 + 4 = ?$
$10 + 5 = ?$	$7 + 7 = ?$	$7 + 5 = ?$	$11 + 2 = ?$
	$8 + 6 = ?$	$8 + 4 = ?$	$9 + 5 = ?$
	$5 + 6 = ?$	$6 + 7 = ?$	$8 + 7 = ?$
	$11 + 3 = ?$	$9 + 3 = ?$	$2 + 13 = ?$

5.	6.	7.	8.
$7 + ? = 14$	$7 + ? = 13$	$9 + ? = 14$	$12 + ? = 15$
$9 + ? = 15$	$8 + ? = 12$	$8 + ? = 13$	$11 + ? = 14$
$4 + ? = 13$	$5 + ? = 15$	$7 + ? = 11$	$9 + ? = 12$
$6 + ? = 12$	$7 + ? = 12$	$6 + ? = 10$	$10 + ? = 15$
$9 + ? = 11$	$6 + ? = 15$	$5 + ? = 9$	$7 + ? = 15$

9.	10.	11.	12.
$? + 5 = 11$	$? + 4 = 15$	$? + 7 = 15$	$? + 2 = 12$
$? + 6 = 15$	$? + 10 = 12$	$? + 8 = 15$	$? + 3 = 11$
$? + 7 = 14$	$? + 12 = 14$	$? + 9 = 15$	$? + 3 = 15$
$? + 8 = 12$	$? + 13 = 15$	$? + 6 = 15$	$? + 6 = 14$
$? + 9 = 10$	$? + 4 = 9$	$? + 5 = 15$	$? + 4 = 8$

13.	14.	15.	16.
$3 + 12 = ?$	$15 \div 5 = ?$	$12 \div 4 = ?$	$9 \div 3 = ?$
$4 + 11 = ?$	$15 \div 3 = ?$	$12 \div 3 = ?$	$8 \div 4 = ?$
$7 + 8 = ?$	$14 \div 7 = ?$	$12 \div 2 = ?$	$8 \div 2 = ?$
$6 + 9 = ?$	$14 \div 2 = ?$	$10 \div 5 = ?$	$6 \div 3 = ?$
$5 + 10 = ?$	$12 \div 6 = ?$	$10 \div 2 = ?$	$6 \div 2 = ?$

Fill the blanks with any suitable words:

1. Four (——) and three (——) are (——).
2. Nine (——) and two (——) are (——).
3. Eight (——) less five (——) are (——).
4. Eleven (——) less nine (——) are (——).
5. Twelve (——) less six (——) are (——).
6. Six (——) and seven (——) are (——).
7. Seven (——) and seven (——) are (——).
8. Eight (——) and six (——) are (——).
9. Nine (——) and four (——) are (——).
10. Eight (——) and seven (——) are (——).
11. Ten (——) and five (——) are (——).
12. Fifteen (——) less nine (——) are (——).
13. Fourteen (——) less eight (——) are (——).
14. Three (——) and twelve (——) are (——).
15. Five (——) and nine (——) are (——).
16. Nine (——) and six (——) are (——).
17. Ten (——) and three (——) are (——).
18. Seven (——) and eight (——) are (——).
19. Twelve (——) less eight (——) are (——).
20. Eleven (——) less seven (——) are (——).
21. Seven (——) and four (——) are (——).
22. Six (——) and five (——) are (——).
23. Fifteen (——) less four (——) are (——).
24. Six (——) and four (——) are (——).
25. Fifteen (——) less six (——) are (——).
26. Fifteen (——) less thirteen (——) are (——).
27. Seven (——) and six (——) are (——).
28. Nine (——) and three (——) are (——).
29. Five (——) and seven (——) are (——).
30. Thirteen (——) less eight (——) are (——).
31. Four (——) and nine (——) are (——).
32. Twelve (——) less nine (——) are (——).
33. Thirteen (——) less seven (——) are (——).

Add:

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
4	8	9	6	10	8	9	7	7	6
7	3	2	5	2	6	6	8	7	4

Add:

11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
5	4	7	4	6	5	4	7	7	6
2	6	5	4	7	5	6	5	4	4
5	2	2	6	2	5	2	1	2	4

Add:

21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
4	5	6	1	7	2	4	9	8	7
2	4	7	2	1	6	8	5	3	7
7	3	1	8	3	4	2	1	2	0
1	2	1	2	3	3	1	0	1	1

31.	32.	33.	34.
$7 + 8 = ?$	$15 - 10 = ?$	$15 \div 5 = ?$	$5 \times 3 = ?$
$15 - 9 = ?$	$13 + 2 = ?$	$15 - 7 = ?$	$15 \div 15 = ?$
$15 \div 5 = ?$	$15 \div 3 = ?$	$11 + 4 = ?$	$5 + 10 = ?$
$6 + 9 = ?$	$15 - 11 = ?$	$15 - 6 = ?$	$15 - 8 = ?$

Subtract:

35.	36.	37.	38.	39.	40.	41.	42.	43.	44.
15	14	12	7	9	11	15	15	14	13
8	7	6	4	5	5	10	9	8	7

45.	46.	47.	48.
$5 \times 3 = ?$	$5 \times 2 = ?$	$2 \times 2 = ?$	$6 \times 1 = ?$
$6 \times 2 = ?$	$3 \times 4 = ?$	$3 \times 2 = ?$	$2 \times 6 = ?$
$7 \times 2 = ?$	$4 \times 3 = ?$	$2 \times 7 = ?$	$4 \times 2 = ?$
$3 \times 3 = ?$	$3 \times 5 = ?$	$2 \times 5 = ?$	$3 \times 1 = ?$

1. What part of 15 horses are 5 horses?

2. What part of 12 books are 3 books?

3. From 15 take 4, subtract 5, multiply by 2, divide by 3, add 3, multiply by 2, subtract 9, multiply by 3; write result.

4. What 3 pieces of money will make 15 cents?

5. What 2 pieces of money will make 15 cents?

6. A cooper made 15 barrels and sold 8; how many had he left?

7. If your father pays 8 dollars for coal, and 7 dollars for flour, how many dollars does he pay out in all?

8. A woman had 15 hens, and sold all but 6 of them. How many did she sell?

9. Divide 14 by 7, multiply by 6, subtract 3, add 6, divide by 5, multiply by 3, add 5, divide by 2, add 8; write the result.

10. A pig cost 5 dollars and a sheep 7 dollars; how much did they both cost?

11. There were 6 boys playing ball, and 9 boys looking on; how many boys were there in all?

12. At 2 cents a pint, what will 2 quarts and 1 pint of milk cost?

13. How many pints in 3 quarts and 1 pint?

14. How many quarts in 3 gallons and 2 quarts?

15. How many pints in 1 gallon, 1 quart, 1 pint?

16. How many days in 2 weeks, 1 day?

17. How many months in 1 year, 3 months?

18. How many inches in 1 foot, 3 inches?

19. How many feet in 4 yards, 2 feet?

20. Draw a rectangle 5 inches long and 2 inches wide. How many inches is it round it?

21. If your rabbit pen is 5 yards long and 2 yards wide, how long a fence do you have to build to inclose it?

22. Write all the pairs of numbers that make 15.

1. Take 15 one-inch sticks. How many triangles can you make with the 15 sticks, using one stick on a side?

2. How many squares can you make? and how many sticks are left over?

3. What can you make with the sticks left over?

4. Make as many rectangles as you can that are 2 inches long and 1 inch wide. How many have you made? What can you make with what is left?

5. Make a 3-inch square. What can you make with the sticks that are left?

6. Draw 15 parallel lines. Draw 15 vertical lines.

7. Draw 15 horizontal lines. Draw 15 oblique lines.

8. Draw a rectangle 4 in. by 3 in., and draw its diagonal.

9. Into how many triangles did you divide the rectangle?

10. Measure the distance around the triangle.

11. Cut out 2 right-triangles. Put them together so as to make a square or rectangle.

12. Go out of doors, and mark 2 lines on the sidewalk 15 feet apart. Measure, and see how near you guessed.

13. Guess at the height of your desk. Measure it. How near did you guess?

14. From a string 15 feet long cut off 5 yards. How much is left?

15. If you had a dime to spend, and should buy a pencil for 5 cents, and a sponge for 3 cents, how many marbles could you then buy at 2 cents each?

16. What is $\frac{1}{3}$ of 15? What are $\frac{2}{3}$ of 15?

17. Make 10 columns of figures, 3 figures in each column, the sum of which shall in each column be 15.

18. Draw a rectangle 15 inches long and 1 inch wide. How many square inches does it contain?

19. How many pentagons can you make with 15 sticks?

20. Make a square, and divide it into 4 equal triangles.

21. What lines did you draw to do it?

1. What two pieces of gold money make $15?

2. What two pieces of paper money make $15?

3. If a man who had 15 sheep should sell $\frac{1}{3}$ of them, how many would he have left?

4. What 5 equal numbers make 15?

5. George may draw a line 7 feet long, Charles may draw a line 1 foot longer. How long are both the lines?

6. Five triangles have how many corners?

7. How many more corners or angles have 5 triangles than 3 squares?

8. If it takes 3 yards of ribbon to trim each hat, how many yards of ribbon will it take to trim 5 hats?

9. How many parts has a clover leaf? How many parts have 5 clover leaves?

10. 15 cents will buy how many lead pencils, if 1 pencil costs 3 cents?

11. If I have 15 chestnuts, to how many boys can I give 5 each?

12. How many little dolls can you buy for 15 cents, at the rate of 3 for 5 cents?

13. If it is 10 miles to my home, how many miles is it there and half way back?

14. How many cents must you put with 9 cents to make 15 cents?

15. Take a string 5 inches long; how many times must you cut it to make 5 pieces 1 inch long?

16. Into how many pieces shall I cut a string 10 inches long, if I cut it 9 times? How long will each piece be if they are of equal length?

17. How many Sundays are there in 15 days, beginning with Sunday? Beginning with Monday? Beginning with Saturday?

18. If I can buy 5 marbles for 2 cents, how much will 15 marbles cost?

1. What measure do you use in measuring milk?

2. Write the table.

3. Write the abbreviations for gill, pint, quart, gallon.

4. Make 4 examples, using the words: gills, pints, quarts, gallons.

5. How many 2-quart pails will it take to hold 2 gallons?

6. How many pint pails will it take to hold a gallon and a half?

7. Fill out the blanks:

1 pint	= — gills.	1¼ feet	= — inches.
3 gallons	= — quarts.	15 feet	= — yards.
3½ quarts	= — pints.	4 yards	= — feet.
10 gills	= — quarts.	15 inches	= — feet.

8. A wasp has 2 pairs of wings, a large pair and a small pair. How many wings has a wasp? How many have 3 wasps?

9. What will 2 quarts and a pint of milk cost at 6 cents a quart?

10. How many have ever seen an ox? Did you see his foot? How many parts were there to each foot? How many shoes does it take to shoe one ox?

11. What will 3 yards of cloth cost at $5 a yard?

12. If Grace knits 5 rows a day, how many rows will she knit in 3 days?

13. If a man had $11, and should buy some corn for $5, how much money would he have left?

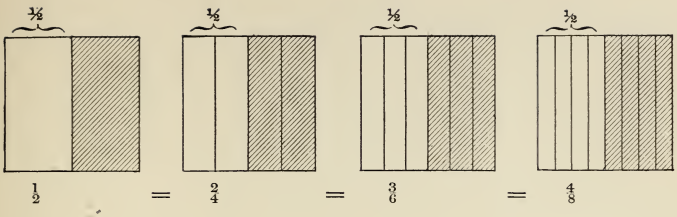
14. Two boys wish to buy a ball together. One boy has 7 cents, and the other has 6 cents; how many more cents do the boys need if the ball costs 15 cents?

15. A man owed $15, and paid $9 of it; how much did he then owe?

16. A farmer sold some potatoes for $5, and some butter for $7; he then bought a barrel of flour for $6. How much money did the farmer have left?

1. 9×1 and (——) = 15.
2. 5×3 and (——) = 15.
3. 7×2 and (——) = 15.
4. 3×3 and (——) = 15.
5. 6×2 and (——) = 15.
6. 12×1 and (——) = 15.
7. 4×3 and (——) = 15.
8. 2×5 and (——) = 15.
9. 12 is contained in 15 (——) times and (——) over.
10. 6 is contained in 15 (——) times and (——) over.
11. 8 is contained in 15 (——) times and (——) over.
12. 10 is contained in 15 (——) times and (——) over.
13. 9 is contained in 15 (——) times and (——) over.
14. 4 is contained in 15 (——) times and (——) over.
15. 2 is contained in 15 (——) times and (——) over.
16. 11 is contained in 15 (——) times and (——) over.
17. 7 is contained in 15 (——) times and (——) over.
18. 5 is contained in 15 (——) times and (——) over.
19. 13 is contained in 15 (——) times and (——) over.
20. 3 is contained in 15 (——) times and (——) over.
21. 14 is contained in 15 (——) times and (——) over.
22. 15 is (——) more than 10.
23. 15 is (——) more than 7.
24. 15 is (——) more than 8.
25. 15 is (——) more than 11.
26. 15 is (——) more than 6.
27. 15 is (——) more than 9.
28. 15 is (——) more than 5.
29. 15 is (——) more than 4.
30. 15 is (——) more than 12.
31. 9 is (——) less than 15.
32. Sight addition:

7	8	6	7	8	4	8	9	4	6
7	5	9	6	7	9	6	5	9	5



1. Into how many parts is the first figure divided? How many parts are crossed out?

2. Into how many parts is the second figure divided? How many parts are crossed out?

3. How do the parts crossed in the first and second figure compare in size?

4. What can you say then about $\frac{1}{2}$ and $\frac{2}{4}$?

5. Draw 2 lines, and prove that $\frac{1}{2}$ equals $\frac{2}{4}$.

6. Into how many parts is the third figure divided? How many parts are crossed out?

7. How does the size of the part crossed in the third figure compare with the size of the part crossed in the first figure? Second?

8. What can you say then about $\frac{1}{2}$ and $\frac{3}{6}$? About $\frac{2}{4}$ and $\frac{3}{6}$?

9. Prove by lines that $\frac{1}{2}$, $\frac{2}{4}$, and $\frac{3}{6}$ are alike.

10. Into how many parts is the fourth figure divided? How many parts are crossed out?

11. How does the size of the part crossed off in the fourth figure compare with the size of the parts crossed in the other figures?

12. What is true then of $\frac{1}{2}$ and $\frac{4}{8}$? $\frac{2}{4}$ and $\frac{4}{8}$? $\frac{3}{6}$ and $\frac{4}{8}$?

13. Prove by lines that $\frac{1}{2}$, $\frac{2}{4}$, $\frac{3}{6}$, and $\frac{4}{8}$ are alike.

14. Draw 4 rectangles 8 inches long and 1 inch wide. Prove from those rectangles that $\frac{1}{2}$ equals $\frac{4}{8}$. $\frac{2}{4}$ equals $\frac{3}{6}$.

15. Which is larger, $\frac{1}{2}$ or $\frac{1}{4}$ of an orange?

Illustrate each of the following:

1.

$\frac{1}{2} + \frac{1}{2} = \frac{}{2}$

$\frac{1}{3} + \frac{1}{3} = \frac{}{3}$

$\frac{1}{4} + \frac{1}{4} = \frac{}{4}$

$\frac{1}{6} + \frac{1}{6} = \frac{}{6}$

2.

$\frac{1}{3} + \frac{2}{3} = \frac{}{3}$

$\frac{1}{4} + \frac{2}{4} = \frac{}{4}$

$\frac{1}{4} + \frac{3}{4} = \frac{}{4}$

$\frac{1}{6} + \frac{2}{6} = \frac{}{6}$

3.

$\frac{1}{6} + \frac{3}{6} = \frac{}{6}$

$\frac{1}{6} + \frac{4}{6} = \frac{}{6}$

$\frac{1}{6} + \frac{5}{6} = \frac{}{6}$

$\frac{1}{8} + \frac{1}{8} = \frac{}{8}$

4.

$\frac{1}{8} + \frac{2}{8} = \frac{}{8}$

$\frac{1}{8} + \frac{3}{8} = \frac{}{8}$

$\frac{1}{8} + \frac{4}{8} = \frac{}{8}$

$\frac{1}{8} + \frac{5}{8} = \frac{}{8}$

5.

$\frac{1}{8} + \frac{6}{8} = \frac{}{8}$

$\frac{1}{8} + \frac{7}{8} = \frac{}{8}$

$\frac{2}{4} + \frac{2}{4} = \frac{}{4}$

$\frac{2}{6} + \frac{2}{6} = \frac{}{6}$

6.

$\frac{2}{6} + \frac{3}{6} = \frac{}{6}$

$\frac{3}{6} + \frac{3}{6} = \frac{}{6}$

$\frac{2}{8} + \frac{4}{8} = \frac{}{8}$

$\frac{4}{8} + \frac{4}{8} = \frac{}{8}$

7.

$\frac{1}{2} = \frac{}{6}$

$\frac{1}{2} = \frac{}{8}$

$\frac{1}{2} = \frac{}{4}$

8.

$\frac{2}{2} = \frac{}{6}$

$\frac{2}{2} = \frac{}{4}$

$\frac{2}{2} = \frac{}{8}$

9.

$\frac{1}{4} = \frac{}{8}$

$\frac{2}{4} = \frac{}{6}$

$\frac{2}{4} = \frac{}{2}$

10.

$\frac{3}{4} = \frac{}{8}$

$\frac{2}{8} = \frac{}{4}$

$\frac{4}{8} = \frac{}{6}$

11.

$\frac{2}{6} + \frac{4}{6} = \frac{}{6}$

$\frac{2}{6} + \frac{4}{6} = \frac{}{3}$

$\frac{2}{6} + \frac{5}{6} = \frac{}{6}$

$\frac{2}{8} + \frac{2}{8} = \frac{}{8}$

$\frac{1}{3} + \frac{1}{3} = \frac{}{6}$

12.

$\frac{2}{8} + \frac{2}{8} = \frac{}{4}$

$\frac{2}{8} + \frac{2}{8} = \frac{}{2}$

$\frac{2}{8} + \frac{2}{8} = \frac{}{6}$

$\frac{2}{8} + \frac{3}{8} = \frac{}{8}$

$\frac{1}{4} + \frac{1}{4} = \frac{}{2}$

13.

$\frac{2}{8} + \frac{4}{8} = \frac{}{4}$

$\frac{2}{8} + \frac{5}{8} = \frac{}{8}$

$\frac{2}{8} + \frac{6}{8} = \frac{}{8}$

$\frac{2}{8} + \frac{6}{8} = \frac{}{2}$

$\frac{1}{6} + \frac{1}{6} = \frac{}{3}$

14.

$\frac{1}{2} - \frac{1}{4} = \frac{}{4}$

$\frac{3}{4} - \frac{1}{2} = \frac{}{4}$

$\frac{3}{4} - \frac{1}{4} = \frac{}{2}$

$1 - \frac{1}{4} = \frac{}{4}$

$1 - \frac{1}{2} = \frac{}{2}$

15.

$\frac{3}{6} - \frac{1}{6} = \frac{}{6}$

$\frac{3}{6} - \frac{1}{6} = \frac{}{3}$

$\frac{3}{6} - \frac{1}{3} = \frac{}{6}$

$1 - \frac{1}{3} = \frac{}{3}$

$1 - \frac{2}{3} = \frac{}{3}$

16.

$\frac{4}{8} + \frac{1}{2} = \frac{}{8}$

$\frac{4}{8} + \frac{2}{4} = \frac{}{4}$

$\frac{2}{8} + \frac{1}{4} = \frac{}{2}$

$\frac{2}{8} + \frac{1}{2} = \frac{}{4}$

$\frac{1}{8} + \frac{1}{4} = \frac{}{8}$



NOTE. — There should be a clock-dial in the room. Each child should be allowed to use it in connection with the problems of this lesson, in order that he may "learn by doing."

1. Of what is this a picture? How many pointers are there?

2. Are they of the same length?

3. What does the long pointer tell? The long pointer tells the minutes.

4. What does the short pointer tell? The short pointer tells the hours.

5. Have you ever noticed where the long pointer was when the clock struck the hour? Where was it?

6. Put both pointers at XII. It is now 12 o'clock.

7. Let the long pointer remain there. Put the short pointer at I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII. Tell what hour it is with the long pointer at XII and the short one at each of these figures.

8. Draw a clock-face that shows 9 o'clock. 10 o'clock.

9. How long does it take the long pointer to move round the face?

10. How far does the short pointer move, while the long pointer is going round once?

11. Where is the long pointer when it is half way round?

12. Show on the clock-face half past 12. Where is the short pointer?

13. Show on the clock-face half past 10. Half past 3.

14. Show on the clock-face half past 9. Half past 1.

15. Show on the clock-face half past 6. Half past 11.

16. Show on the clock-face the time when school begins in the morning and afternoon.

17. Show when the school closes in the morning and afternoon.

18. Turn the pointers on the dial so as to indicate each hour and each half hour of the day.



10 + 6 = 16

6 + 10, or 10 + 6 = 16
7 + 9, or 9 + 7 = 16
8 + 8 = 16

XVI = 16

1.

4 + 12 = ?
10 + 6 = ?

2.

7 + 7 = ?
9 + 7 = ?
8 + 7 = ?
9 + 6 = ?
8 + 5 = ?

3.

6 + 7 = ?
7 + 5 = ?
6 + 6 = ?
5 + 8 = ?
9 + 5 = ?

4.

5 + 10 = ?
11 + 4 = ?
10 + 4 = ?
8 + 6 = ?
9 + 3 = ?

5.

6 + ? = 13
8 + ? = 16
7 + ? = 15
5 + ? = 10
9 + ? = 13

6.

10 + ? = 16
4 + ? = 15
3 + ? = 13
9 + ? = 12
6 + ? = 11

7.

15 + ? = 16
14 + ? = 15
12 + ? = 14
10 + ? = 13
9 + ? = 12

8.

8 + ? = 16
7 + ? = 16
9 + ? = 16
6 + ? = 16
5 + ? = 16

9.

? + 10 = 15
? + 9 = 16
? + 8 = 14
? + 7 = 16

10.

? + 8 = 16
? + 9 = 14
? + 6 = 15
? + 5 = 9

11.

? + 14 = 16
? + 15 = 16
? + 13 = 16
? + 12 = 16

12.

? + 5 = 16
? + 4 = 12
? + 9 = 16
? + 10 = 15

13.

16 − 14 = ?
16 − 12 = ?
16 − 10 = ?
16 − 8 = ?
16 − 11 = ?
16 − 7 = ?

14.

16 − ? = 4
16 − ? = 6
16 − ? = 8
16 − ? = 10
16 − ? = 9
16 − ? = 7

15.

? − 7 = 9
? − 8 = 8
? − 9 = 7
? − 6 = 10
? − 7 = 8
? − 9 = 4

16.

7 + 9 = ?
8 + 8 = ?
5 + 11 = ?
6 + 7 = ?
2 + 14 = ?
6 + 10 = ?

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
5	6	4	5	3	2	3	4	1	7
4	7	8	5	4	4	5	6	5	5
3	1	2	5	5	6	7	3	7	2
?	?	?	?	?	?	?	?	?	?
16	16	16	16	16	16	16	16	16	16

11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
5	4	7	1	9	8	7	5	4	3
6	7	6	0	1	0	6	5	4	3
3	1	0	9	2	2	0	5	4	3
2	4	2	5	0	4	2	1	4	5

21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
3	4	1	2	6	5	3	2	3	2
5	3	9	6	7	4	6	3	5	3
2	1	3	3	1	3	1	4	4	4
6	8	2	5	2	3	4	2	2	2

31.	32.	33.	34.	35.	36.	37.	38.	39.	40.
7	5	9	6	4	6	9	7	5	8
6	8	4	5	7	7	6	8	9	3

41.	42.	43.	44.	45.	46.	47.	48.	49.	50.
4	2	5	6	9	3	8	8	9	8
7	9	7	4	5	9	6	7	6	5

51.	52.	53.	54.	55.	56.	57.	58.	59.	60.
4	4	4	4	4	4	4	4	4	5
1	2	3	4	5	6	7	8	9	8

61.	62.	63.	64.	65.	66.	67.	68.	69.	70.
9	9	9	9	9	9	9	8	8	8
1	2	3	4	5	7	6	8	7	6

LESSON 56.

DRILL IN SUBTRACTION.

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1	3	5	7	9	10	2	4	6	8
1	1	1	1	1	1	1	1	1	1

11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
10	8	6	4	2	9	7	5	12	3
2	2	2	2	2	2	2	2	2	2

21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
3	13	4	12	5	11	6	10	7	9
3	3	3	3	3	3	3	3	3	3

31.	32.	33.	34.	35.	36.	37.	38.	39.	40.
4	16	5	15	13	9	8	12	14	10
4	4	4	4	4	4	4	4	4	4

41.	42.	43.	44.	45.	46.	47.	48.	49.	50.
16	14	12	10	8	6	15	13	11	9
5	5	5	5	5	5	5	5	5	5

51.	52.	53.	54.	55.	56.	57.	58.	59.	60.
16	6	14	8	12	10	15	7	13	9
6	6	6	6	6	6	6	6	6	6

61.	62.	63.	64.	65.	66.	67.	68.	69.	70.
15	7	13	9	11	16	8	14	10	12
7	7	7	7	7	7	7	7	7	7

71.	72.	73.	74.	75.	76.	77.	78.	79.	80.
8	9	10	11	12	13	14	15	16	11
8	8	8	8	8	8	8	8	8	8

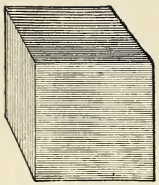
1.	2.	3.	4.
$2 \times 2 = ?$	$4 \times 3 = ?$	$2 \times 3 = ?$	$3 \times 4 = ?$
$3 \times 3 = ?$	$5 \times 2 = ?$	$2 \times 5 = ?$	$3 \times 5 = ?$
$4 \times 4 = ?$	$6 \times 2 = ?$	$2 \times 8 = ?$	$8 \times 2 = ?$
$5 \times 3 = ?$	$4 \times 2 = ?$	$2 \times 6 = ?$	$2 \times 7 = ?$

5.	6.	7.	8.
$2 \times ? = 8$	$4 \times ? = 12$	$3 \times ? = 6$	$2 \times ? = 10$
$3 \times ? = 12$	$5 \times ? = 15$	$4 \times ? = 8$	$4 \times ? = 12$
$4 \times ? = 16$	$6 \times ? = 12$	$5 \times ? = 10$	$5 \times ? = 10$
$5 \times ? = 10$	$7 \times ? = 14$	$8 \times ? = 16$	$3 \times ? = 9$

9.	10.	11.	12.
$10 \div 2 = ?$	$9 \div 3 = ?$	$10 \div 5 = ?$	$16 \div 2 = ?$
$14 \div 7 = ?$	$12 \div 4 = ?$	$15 \div 5 = ?$	$12 \div 3 = ?$
$16 \div 8 = ?$	$8 \div 8 = ?$	$16 \div 4 = ?$	$15 \div 3 = ?$
$10 \div 2 = ?$	$6 \div 3 = ?$	$14 \div 2 = ?$	$8 \div 4 = ?$

13.	14.	15.	16.
$16 \div 5 = ?$	$10 \div 3 = ?$	$14 \div 4 = ?$	$6 \div 4 = ?$
$14 \div 3 = ?$	$9 \div 4 = ?$	$16 \div 6 = ?$	$7 \div 6 = ?$
$15 \div 6 = ?$	$16 \div 7 = ?$	$13 \div 7 = ?$	$9 \div 8 = ?$
$12 \div 6 = ?$	$13 \div 6 = ?$	$12 \div 8 = ?$	$10 \div 4 = ?$

17.	18.	19.	20.
$2 \times 2 = ?$	$2 \times 5 = ?$	$3 \times 5 = ?$	$4 \times 2 = ?$
$2 \times 6 = ?$	$2 \times 7 = ?$	$4 \times 1 = ?$	$4 \times 4 = ?$
$2 \times 4 = ?$	$3 \times 1 = ?$	$4 \times 3 = ?$	$5 \times 2 = ?$
$2 \times 8 = ?$	$3 \times 4 = ?$	$5 \times 1 = ?$	$6 \times 1 = ?$
$2 \times 3 = ?$	$3 \times 3 = ?$	$5 \times 3 = ?$	$6 \times 2 = ?$



A Cube.

NOTE. — Place a cube on each pupil's desk.

1. Count the surfaces of your cube.
2. How many surfaces has the cube?
3. Put your finger on its upper surface or face.
4. How many edges has the upper face?
5. Put your finger on another face of the cube.
6. How many edges does it have? How many edges does each face have?
7. Put your finger on the front left-hand point of the upper face.
8. How many lines meet at this point?
9. How many corners or points has the cube? How many lines meet at each point?
10. Of the lines meeting at each point, how many are horizontal?
11. How many are vertical?
12. How many lines or edges has the cube?
13. How many pairs of parallel lines has the cube?
14. See how many things you can write that are true of the cube.
15. See how large a list you can make of things you can see that have 6 surfaces.
16. How many square inches are there in the entire surface of the inch cube?
17. Hold your cube, if you can, so that none of its edges will be vertical.
18. Hold it, if you can, so that none of its edges will be parallel.
19. Put your finger on the upper back left-hand corner of the cube.
20. You may each dictate some line or corner or face for the class to touch.

1. Take 16 inch sticks.

2. How many triangles can you make, using one stick on a side?

3. How many squares can you make?

4. How many pentagons can you make?

5. Make 1 square, and use all the sticks. How many sticks are on each side?

6. Make a pentagon, a square, and 2 triangles. How many sticks are left?

7. Make an equilateral triangle, with 5 sticks on a side. How many sticks are left?

8. Make a rectangle 4 sticks long, and one-half as wide. Make a square with the sticks that are left.

9. How many times larger is the rectangle than the square?

10. Arrange the sticks into 2 parallel vertical lines. How many sticks are in each line?

11. Arrange the sticks into 4 parallel horizontal lines. How many sticks are in each line?

12. Make an original design with your sticks.

13. Draw a rectangle 16 inches long and 1 inch wide. Find the number of square inches in it.

14. Draw another rectangle that contains as many square inches as in Example 13.

15. Draw a square that contains as many square inches.

16. Find the perimeter and area of a rectangle 6 feet by 2 feet.

17. Draw a line 16 feet long.

18. Draw a line 3 yards and 1 foot long.

19. Guess a distance on the floor of 16 ft. Measure it.

20. Guess a distance out doors of 16 yds. Measure it.

21. Draw without measuring a vertical line 16 in. long. Test it.

22. Find area and perimeter of a rectangle 3 ft. by 5 ft.

1. If you had 2 bushels of walnuts, how many pecks would you have?

2. If you had 16 pecks of chestnuts, how many bushels would you have?

3. How many pecks of walnuts are there in ½ bushel?

4. How many quarts of nuts would you have if you had ½ bushel?

5. If you had ½ bushel of nuts, to how many persons could you sell 2 quarts each, and have 2 quarts left for yourself?

6. If you should gather 2 bushels of chestnuts, and give your brother a peck, and keep a peck yourself, how many pecks would you have left?

7. To how many children could you give a pint of filberts, if you had a peck of them?

8. If you had a peck of nuts, and should give 1 quart to one boy, 2 pints to another, and a pint to another, how many quarts and pints would you have left?

9. Write the table of measures you use in measuring nuts.

10. Name 5 things that are measured with these measures.

11. Fill blanks:

—— stands for peck.
—— stands for quart.
—— stands for bushel.
—— stands for pint.

12. Fill blanks:

4 pt. make —— quarts.
12 qt. make —— pk. and —— qt.
10 pk. make —— bu. and —— qt.
½ bu. makes —— pk.

13. Write 5 examples using quarts.

14. Write 5 examples using pecks.

15. Write 5 examples using bushels.

16. How do you find the number of quarts in a certain number of pecks?

17. How do you find the number of pints in a certain number of quarts?

1. Fill blanks:

—— gills make 1 pint.
—— pints make 1 quart.
—— quarts make 1 gallon.

2. Copy and fill blanks:

—— days make 1 week.
—— months make 1 year.

3. Copy and fill blanks:

—— stands for gill.
—— stands for gallon.
—— stands for day.
—— stands for week.
—— stands for year.

4. How many gills are there in 2 quarts?

5. How many pints are there in 2 gallons?

6. Make 5 examples using gills, pints, quarts, or gallons.

7. Name 4 things that you could buy at a store where the storekeeper would use these measures.

8. In half a gallon of milk, how many quarts of milk?

9. If a pint of water weighs a pound, how much do 2 gallons weigh?

10. How many pint bottles will it take to hold 2 quarts of catsup?

11. How many gallons and quarts in 15 quarts? In 13 quarts? In 16 quarts?

12. 3 quarts is what part of a gallon?

13. How many quarts in $3\frac{3}{4}$ gallons?

14. If 4 gallons of varnish cost \$16, what will 1 gallon cost?

15. At 3 cents a pint, what will $\frac{1}{2}$ a gallon of milk cost?

16. A milkman sold 3 quarts of milk to one man, 4 quarts to another, 5 quarts to another, and 8 pints to another. How many gallons of milk did he sell?

17. How many quarts of milk in 16 pints?

18. Sight addition:

7	8	9	6	7	8	7	6	7	5	9	8
9	8	5	7	8	5	7	5	6	9	7	4

1. Take the clock face. Start with both pointers at XII. Show me every hour and every half hour in the day.

2. Where is the long pointer when it has gone $\frac{1}{4}$ of the way around? Remember, when the long pointer is at III we call it "quarter past."

3. If the long pointer was at III, and the short one a quarter of the distance between I and III, what time would it be?

4. Show quarter past II.

5. Show quarter past IX.

6. Show quarter past XII.

7. Practice until you can place the pointers so as to show quarter past any hour.

8. Where is the long pointer when it has gone $\frac{3}{4}$ of the way around? Remember, when the long pointer is at IX we call it "quarter of."

9. Show quarter of IX. The time for you to start to school.

10. Show quarter past I. Time to start in the afternoon.

11. Show quarter of VII.

12. Show quarter of IV.

13. Show quarter of XII.

14. Show quarter of any hour asked.

15. Do you see the little marks between XII and I? Are there marks between all the numbers?

16. Into how many parts is each space divided?

17. Each division marks 1 minute. How many minutes then between XII and I?

18. Start with both pointers at XII. Move the long pointer to I. Over how many minutes have you moved it? How many minutes past XII is it then?

19. Show 10 minutes past XII.

20. Show 5 minutes past XII.

21. Show 15 minutes past XII.

Drill Tables in Addition, numbers below 16:

	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*
1.	2	9	8	3	5	7	6	4	8	1
2.	9	7	5	8	6	7	7	9	4	9
3.	6	8	8	4	7	8	9	6	9	5
4.	5	4	7	9	9	6	5	9	4	7
5.	8	9	9	3	2	9	7	4	7	8
6.	7	6	4	7	8	3	4	5	5	6
7.	9	8	8	8	7	8	8	8	6	4
8.	3	5	6	5	4	5	8	7	8	9
9.	8	7	9	7	9	8	7	9	3	2
10.	8	9	5	8	3	6	5	4	8	7
11.	7	6	9	6	4	4	9	8	6	5
12.	9	5	5	9	9	8	7	7	8	8
13.	4	7	6	3	5	6	8	5	4	7
14.	7	5	8	9	8	6	8	9	7	6
15.	8	8	5	6	7	5	4	6	8	9
16.	3	5	7	8	5	6	9	7	5	3
17.	9	4	6	7	8	7	4	5	9	7
18.	6	8	7	5	4	8	7	8	4	6

19. Point to any number; let the pupil give the sum of that number and the one above.

20. Point to any column as *e*, pupils give sum, as 13, 7, 12, 13, etc.

21. Add any two lines from left to right.

22. Point to any line as 6, pupils add any given number, as 7.



10 + 7 = 17

7 + 10, or 10 + 7 = 17
8 + 9, or 9 + 8 = 17

XVII = 17

1.	2.	3.
6 + ? = 17	? + 10 = 17	15 + 2 = ?
7 + ? = 17	? + 4 = 17	14 + 3 = ?
8 + ? = 17	? + 6 = 17	13 + 4 = ?
9 + ? = 17	? + 9 = 17	12 + 5 = ?
5 + ? = 17	? + 11 = 17	11 + 6 = ?

4.	5.	6.	7.
17 − 9 = ?	17 − 10 = ?	17 − 2 = ?	17 − ? = 7
17 − 7 = ?	17 − 8 = ?	17 − 16 = ?	17 − ? = 9
17 − 5 = ?	17 − 3 = ?	17 − 13 = ?	17 − ? = 4
17 − 4 = ?	17 − 11 = ?	17 − 14 = ?	17 − ? = 8
17 − 6 = ?	17 − 15 = ?	17 − 1 = ?	17 − ? = 5

8.	9.	10.	11.
17 − ? = 16	? − 5 = 12	? − 8 = 9	? − 4 = 13
17 − ? = 3	? − 7 = 10	? − 6 = 9	? − 5 = 12
17 − ? = 14	? − 4 = 10	? − 7 = 9	? − 6 = 11
17 − ? = 6	? − 8 = 2	? − 5 = 9	? − 7 = 10
17 − ? = 10	? − 5 = 6	? − 3 = 9	? − 8 = 9

12.	13.	14.	15.
8 + 5 = ?	12 + 5 = ?	4 + 7 = ?	10 + 7 = ?
7 + 6 = ?	8 + 4 = ?	11 + 6 = ?	11 + 6 = ?
9 + 8 = ?	6 + 4 = ?	10 + 5 = ?	11 + 4 = ?
8 + 8 = ?	9 + 6 = ?	9 + 5 = ?	8 + 6 = ?
6 + 5 = ?	3 + 7 = ?	9 + 7 = ?	7 + 5 = ?
4 + 13 = ?	9 + 8 = ?	10 + 7 = ?	9 + 4 = ?
12 + 5 = ?	6 + 11 = ?	7 + 8 = ?	11 + 5 = ?

1.

$7+6+2+1+1=?$
$4+5+0+5+3=?$
$2+1+9+2+3=?$
$1+4+4+3+5=?$
$3+0+1+6+2=?$
$6+3+4+3+1=?$
$5+1+6+2+2=?$

2.

$6+5+0+2+4=?$
$2+3+4+3+5=?$
$1+2+3+4+5=?$
$2+3+4+2+3=?$
$2+4+6+5+0=?$
$4+5+3+3+2=?$
$6+7+1+2+1=?$

3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
6	7	9	1	6	4	6	4	6	4
4	5	4	5	5	8	7	3	5	4
3	3	3	0	0	2	1	2	2	4
2	1	1	9	2	0	1	8	3	4

13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
1	2	8	9	4	2	3	1	1	6
2	3	1	0	4	3	4	0	5	4
3	4	1	2	6	4	5	4	0	0
9	8	4	5	3	5	5	9	8	7

23.	24.	25.	26.	27.	28.	29.	30.	31.	32.
3	4	6	5	3	7	8	5	6	4
4	5	4	6	3	7	0	5	5	4
4	3	2	3	5	2	1	4	4	4
3	4	3	3	5	1	8	3	1	5

33.	34.	35.	36.	37.	38.	39.	40.	41.	42.
5	6	1	2	1	4	3	3	4	4
4	4	0	0	2	0	3	2	6	4
3	0	7	4	3	3	3	2	4	0
2	1	2	5	4	4	3	3	3	4
0	3	4	4	5	4	3	4	0	5

1. 4 is contained in 17 (——) times and (——) over.
2. 6 is contained in 17 (——) times and (——) over.
3. 8 is contained in 17 (——) times and (——) over.
4. 9 is contained in 17 (——) times and (——) over.
5. 5 is contained in 17 (——) times and (——) over.
6. 3 is contained in 17 (——) times and (——) over.
7. 2 is contained in 17 (——) times and (——) over.
8. 7 is contained in 17 (——) times and (——) over.
9. 17 is (——) times 4 and (——) over.
10. 17 is (——) times 5 and (——) over.
11. 17 is (——) times 8 and (——) over.
12. 17 is (——) times 4 and (——) over.
13. 17 is (——) times 6 and (——) over.
14. 17 is (——) times 3 and (——) over.
15. 17 is (——) times 2 and (——) over.
16. 17 is (——) times 7 and (——) over.
17. 17 is (——) times 9 and (——) over.
18. 17 is (——) more than 14.
19. 17 is (——) more than 8.
20. 17 is (——) more than 6.
21. 17 is (——) more than 10.
22. 17 is (——) more than 12.
23. 17 is (——) more than 15.
24. 17 is (——) more than 9.
25. 17 is (——) more than 7.
26. 17 is (——) more than 11.
27. 17 is (——) more than 13.
28. 17 is (——) more than 5.
29. 17 is (——) more than 16.
30. 17 is (——) more than 4.
31. 17 is (——) more than 4 times 3.
32. 17 is (——) more than 4 times 4.
33. 17 is (——) more than 3 times 5.
34. 17 is (——) more than 2 times 6.

1.	$3\overline{)17}$	$4\overline{)17}$	$5\overline{)16}$	$6\overline{)17}$	$7\overline{)17}$	$8\overline{)17}$
2.	$3\overline{)16}$	$4\overline{)16}$	$5\overline{)17}$	$6\overline{)16}$	$7\overline{)16}$	$8\overline{)16}$
3.	$3\overline{)15}$	$4\overline{)15}$	$5\overline{)15}$	$6\overline{)15}$	$7\overline{)15}$	$8\overline{)15}$
4.	$3\overline{)14}$	$4\overline{)14}$	$5\overline{)14}$	$6\overline{)14}$	$7\overline{)14}$	$8\overline{)14}$
5.	$3\overline{)13}$	$4\overline{)13}$	$5\overline{)13}$	$6\overline{)13}$	$7\overline{)13}$	$8\overline{)13}$
6.	$3\overline{)12}$	$4\overline{)12}$	$5\overline{)12}$	$6\overline{)12}$	$7\overline{)12}$	$8\overline{)12}$
7.	$9\overline{)17}$	$9\overline{)16}$	$9\overline{)15}$	$9\overline{)14}$	$9\overline{)13}$	$9\overline{)12}$

8.	9.	10.
$\frac{1}{3}$ of 12 = ?	$\frac{1}{3}$ of 16 = ?	$\frac{1}{2}$ of 15 = ?
$\frac{1}{3}$ of 13 = ?	$\frac{1}{3}$ of 17 = ?	$\frac{1}{2}$ of 14 = ?
$\frac{1}{3}$ of 14 = ?	$\frac{1}{2}$ of 17 = ?	$\frac{1}{2}$ of 13 = ?
$\frac{1}{3}$ of 15 = ?	$\frac{1}{2}$ of 16 = ?	$\frac{1}{2}$ of 12 = ?

11.	12.	13.
$\frac{1}{6}$ of 12 = ?	$\frac{1}{4}$ of 15 = ?	$\frac{1}{4}$ of 16 = ?
$\frac{1}{6}$ of 13 = ?	$\frac{1}{4}$ of 8 = ?	$\frac{1}{8}$ of 12 = ?
$\frac{1}{6}$ of 15 = ?	$\frac{1}{4}$ of 12 = ?	$\frac{1}{8}$ of 16 = ?
$\frac{1}{4}$ of 17 = ?	$\frac{1}{4}$ of 14 = ?	$\frac{1}{8}$ of 17 = ?

14.	15.	16.
$\frac{1}{8}$ of 8 = ?	$\frac{1}{6}$ of 6 = ?	$\frac{1}{2}$ of 1 = ?
$\frac{1}{2}$ of 8 = ?	$\frac{1}{3}$ of 6 = ?	$\frac{1}{3}$ of 1 = ?
$\frac{1}{4}$ of 8 = ?	$\frac{1}{2}$ of 6 = ?	$\frac{1}{4}$ of 1 = ?
$\frac{1}{6}$ of 8 = ?	$\frac{1}{4}$ of 6 = ?	$\frac{1}{6}$ of 1 = ?

1. Illustrate by lines and squares:

$\frac{1}{2} = \frac{}{4}$	$\frac{1}{2} = \frac{}{8}$	$\frac{3}{3} = \frac{}{6}$	$\frac{2}{4} = \frac{}{8}$
$\frac{2}{2} = \frac{}{4}$	$\frac{2}{2} = \frac{}{8}$	$\frac{1}{4} = \frac{}{8}$	$\frac{3}{4} = \frac{}{8}$
$\frac{1}{2} = \frac{}{6}$	$\frac{1}{3} = \frac{}{6}$	$\frac{2}{4} = \frac{}{2}$	$\frac{2}{6} = \frac{}{3}$
$\frac{2}{2} = \frac{}{6}$	$\frac{2}{3} = \frac{}{6}$	$\frac{2}{4} = \frac{}{6}$	$\frac{3}{6} = \frac{}{8}$

2. 17 months will make how many years and how many months over?

3. 17 months will make how many seasons and how many months over?

4. 17 inches are how many inches more than a foot?

5. 17 eggs are how many more than 1 dozen eggs?

6. 17 days are how many weeks and how many days over?

7. 17 feet are how many yards and how many feet over?

8. 17 quarts are how many gallons and how many quarts over?

9. 17 pints are how many quarts and how many pints over?

10. 17 gills are how many pints and how many gills over?

11. 17 pecks are how many bushels and how many pecks over?

12. 17 quarts are how many pecks and how many quarts over?

13. 17 cents are how many cents more than a dime?

14. 17 cents are how many cents more than 3 5-cent pieces?

15. 17 cents are how many cents more than 1 dime and 1 5-cent piece?

16. 17 days are how many days more than a fortnight?

17. If you know what 1 book costs, how can you find what 5 books cost?

18. Prove it by an example and illustration.

19. Show what part of 16 pencils 2 pencils are.

ODD AND EVEN.

1. Write all the numbers below 10 that you can evenly divide by 2.

2. Copy and learn: All numbers that can be evenly divided by 2 are called even numbers.

3. Write all the even numbers between 1 and 17.

4. Write 4 numbers on your slate that can *not* be evenly divided by 2.

5. Copy and learn: All numbers that can *not* be evenly divided by 2 are called odd numbers.

6. Write all the odd numbers from 1 to 17.

7. Commence with 2 and count by 2's to 16.

8. Commence with 3 and count by 2's to 17.

9. Bring some corn or beans to school to-morrow, and ask your teacher to let you play "Odd or Even."

10. I had 16 dimes. I gave $\frac{1}{8}$ of them to my sister. How many dimes did I have left?

11. If this room is 5 yards and 2 feet long, how many feet long is it?

12. May had 17 apples. She ate 1, and gave $\frac{1}{2}$ of the rest to her brother. How many did she have left?

13. Carl has a square garden that is 16 feet around it. How long is one side?

14. If you had two 5-cent pieces, one 2-cent piece, one 3-cent piece, and two 1-cent pieces, how many cents would you have?

15. If you should buy 2 sticks of braid and pay 1 cent a yard, and there were 8 yards in each piece, how much would you have to pay for the braid?

16. Some children are coasting on a hill. 4 sleds are going down with a boy and 2 girls on each sled, and 2 boys and 3 girls are drawing their sled up the hill. How many children are on the hill?

1. If you bring up 2 hods of coal from the cellar every morning, and each hod holds $\frac{1}{4}$ of a bushel, how many bushels will you bring up in 2 weeks?

2. If $\frac{1}{2}$ a gallon of vinegar costs 16 cents, what will 1 pint cost?

3. How many times can I fill a 2-quart can from a pail that holds 12 quarts?

4. If Mr. Smith pays 2 cents for a pencil, and 15 cents for some paper, how many cents does he spend?

5. A man bought a barrel of flour for \$6, and paid \$9 for other things; how many dollars did he spend?

6. How many are 12 and 3 less 8? 12 and 4 less 7?

7. How many are 5 and 8 less 12? 12 and 3 less 9?

8. How many are 17 less 5 less 9? 9 and 5 less 6?

9. How many are 9 and 6 less 8?

10. If 3 tables cost \$15, what will 2 tables cost?

11. If 3 pears cost 6 cents, what will 8 pears cost?

12. At 5 dimes each, how many hats can you buy for 15 dimes?

13. How many oranges can you buy for 16 cents if 1 orange costs 4 cents?

14. 3 three-cent pieces and 4 two-cent pieces are how much money?

15. Laura is 17 years old; how old was she 9 years ago?

16. Jennie is 8 years old; how old will she be in 9 years?

17. See how many things you can write about 17?

18. John has 5 apples, and Henry has 2 times as many; how many apples have both John and Henry?

19. At 8 cents each, what will be the cost of 2 inkstands?

20. Frank has 8 cents, and wishes to buy a book that costs 17 cents; how many cents more does he need to pay for the book?

21. If you paid 8 cents for paper, and 6 cents for pencils, how much would you pay in all?

1. What is the area of a flower bed 8 feet long and 2 feet wide?

2. Draw a yard square on the board. Divide it into square feet. How many square feet are there?

3. Find 5 things in the room that you can measure, and then find their area.

4. Draw without using a ruler a vertical line 17 in. long.

5. Draw without using a ruler a horizontal line 1 foot 5 inches long.

6. Take a ruler, and measure the lines you have just drawn to see how much of a mistake you made.

7. Go out of doors and estimate, and then measure a line 17 feet long. Also one 17 yards long.

8. How many squares can you make with 17 inch sticks? and how many sticks will not be used?

9. How many triangles can you make with 17 inch sticks? and how many sticks will not be used?

10. If you had 4 gallons of milk, and should sell 3 quarts at one house, 4 quarts at another, and 6 quarts at a third house, how much would you have left? How much would it be worth at 5 cents a quart?

11. If 3 bu. of lemons cost $12, what will 1 peck cost?

12. Measure 16 feet on the floor or sidewalk. Walk that distance and count your steps.

13. Take that number of steps in a different place. Measure, and see how near it is to 16 feet.

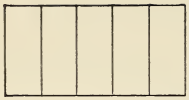
14. To estimate distance by counting your steps is called "pacing."

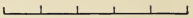
15. Pace 5 yd. 10 ft. 4 yd. 16 ft. 9 ft. 8 ft.

16. Be sure your steps are of the same length. Measure after pacing to find out your mistake.

17. Find out the length of your schoolroom in yards by measuring.

18. Draw a rectangle and both of its diagonals.



1. Point to one part of the rectangle.
2. What is one part called?
3. Point to one part of the pentagon.
4. Point to one part of the circle.
5. Point to one part of the line.
6. Draw a rectangle 5 inches long, and 1 inch wide. Divide it into 5 equal parts. Cross off $\frac{1}{5}$ of it.
7. Illustrate by lines:

$\frac{1}{5}$ of 5	$\frac{2}{5}$ of 5	$\frac{3}{5}$ of 5	$\frac{4}{5}$ of 5
$\frac{1}{5}$ of 10	$\frac{2}{5}$ of 10	$\frac{3}{5}$ of 10	$\frac{4}{5}$ of 10
$\frac{1}{5}$ of 15	$\frac{2}{5}$ of 15	$\frac{3}{5}$ of 15	$\frac{4}{5}$ of 15

8. What part of 5 is 1?
9. What part of 5 is 2?
10. What part of 15 is 5?
11. What part of 10 is 2?
12. How much money have you if 3 cents is $\frac{1}{5}$ of it?
13. How many marbles have you if 2 is $\frac{1}{5}$ of them?
14. Place 15 blocks on your desk; take away $\frac{1}{5}$ of them; take away 2 blocks more; take away $\frac{1}{2}$ of what remain. How many are left?
15. Place 6 blocks on your desk; take $\frac{1}{2}$ as many more; take 1 more; take away $\frac{1}{3}$ of what you have; take away $\frac{1}{4}$ of what are now left. How many blocks have you?
16. Make 5 examples, using the fraction $\frac{1}{5}$ in each.
17. Which is larger, $\frac{1}{2}$ of 6, or $\frac{1}{6}$ of 18?
18. Which is larger, $\frac{1}{2}$ of 12, or $\frac{1}{6}$ of 12?
19. Which is larger, $\frac{1}{3}$ of 15, or $\frac{1}{5}$ of 15?
20. Which is larger, $\frac{1}{3}$ of 12, or $\frac{1}{4}$ of 12?
21. Which is larger, $\frac{1}{4}$ of 16, or $\frac{1}{5}$ of 15?
22. Which is larger, $\frac{1}{3}$ of 12, or $\frac{1}{2}$ of 10?


10 + 8 = 18

8 + 10, or 10 + 8 = 18 XVIII = 18
9 + 9 = 18

1.	2.	3.
15 + 3 = ?	8 + 7 = ?	8 + 10 = ?
7 + 11 = ?	9 + 8 = ?	14 + 4 = ?
9 + 9 = ?	6 + 5 = ?	13 + 3 = ?
6 + 12 = ?	11 + 7 = ?	11 + 5 = ?

4.	5.	6.	7.
7 + ? = 18	5 + ? = 18	2 + ? = 18	? + 8 = 18
6 + ? = 18	15 + ? = 18	14 + ? = 18	? + 14 = 18
8 + ? = 18	4 + ? = 18	3 + ? = 18	? + 11 = 18
9 + ? = 18	13 + ? = 18	16 + ? = 18	? + 9 = 18

8.	9.	10.	11.
18 − 8 = ?	18 − 10 = ?	18 − 1 = ?	18 − 4 = ?
18 − 14 = ?	18 − 2 = ?	18 − 13 = ?	18 − 6 = ?
18 − 9 = ?	18 − 7 = ?	18 − 3 = ?	18 − 11 = ?
18 − 15 = ?	18 − 15 = ?	18 − 16 = ?	18 − 12 = ?

12.	13.	14.	15.
18 = 7 + ?	18 = 2 + ?	18 = 1 + ?	½ of 18 = ?
18 = 10 + ?	18 = 13 + ?	18 = 4 + ?	⅓ of 18 = ?
18 = 5 + ?	18 = 15 + ?	18 = 6 + ?	⅙ of 18 = ?
18 = 14 + ?	18 = 3 + ?	18 = 11 + ?	¼ of 18 = ?
18 = 8 + ?	18 = 9 + ?	18 = 12 + ?	⅕ of 18 = ?

16.	17.	18.	19.
2 + 16 = ?	8 + 8 = ?	⅓ of 15 = ?	½ of 16 = ?
13 + 5 = ?	7 + 10 = ?	⅓ of 15 = ?	½ of 14 = ?
9 + 7 = ?	9 + 6 = ?	¼ of 12 = ?	⅕ of 10 = ?

1.	2.	3.	4.
$1 \times 2 = ?$	$9 \times 2 = ?$	$2 \times 4 = ?$	$3 \times 6 = ?$
$2 \times 2 = ?$	$1 \times 3 = ?$	$3 \times 4 = ?$	$1 \times 7 = ?$
$3 \times 2 = ?$	$2 \times 3 = ?$	$4 \times 4 = ?$	$2 \times 7 = ?$
$4 \times 2 = ?$	$3 \times 3 = ?$	$1 \times 5 = ?$	$1 \times 8 = ?$
$5 \times 2 = ?$	$4 \times 3 = ?$	$2 \times 5 = ?$	$2 \times 8 = ?$
$6 \times 2 = ?$	$5 \times 3 = ?$	$3 \times 5 = ?$	$1 \times 9 = ?$
$7 \times 2 = ?$	$6 \times 3 = ?$	$1 \times 6 = ?$	$2 \times 9 = ?$
$8 \times 2 = ?$	$1 \times 4 = ?$	$2 \times 6 = ?$	$1 \times 10 = ?$

5.	6.	7.	8.
$6 \times 3 = ?$	$4 \times 3 = ?$	$7 \times 2 = ?$	$3 \times 4 = ?$
$4 \times 4 = ?$	$3 \times 5 = ?$	$8 \times 2 = ?$	$3 \times 2 = ?$
$2 \times 8 = ?$	$2 \times 9 = ?$	$3 \times 6 = ?$	$5 \times 3 = ?$
$9 \times 2 = ?$	$6 \times 2 = ?$	$2 \times 5 = ?$	$2 \times 6 = ?$

9.	10.	11.	12.
$18 \div 3 = ?$	$16 \div 4 = ?$	$15 \div 5 = ?$	$12 \div 6 = ?$
$18 \div 6 = ?$	$16 \div 2 = ?$	$15 \div 3 = ?$	$12 \div 3 = ?$
$18 \div 9 = ?$	$16 \div 8 = ?$	$14 \div 7 = ?$	$12 \div 2 = ?$
$18 \div 2 = ?$	$16 \div 3 = ?$	$14 \div 2 = ?$	$14 \div 4 = ?$

13.	14.	15.	16.
$18 \div 1 = ?$	$18 \div 5 = ?$	$18 \div 9 = ?$	$18 \div 13 = ?$
$18 \div 2 = ?$	$18 \div 6 = ?$	$18 \div 10 = ?$	$18 \div 14 = ?$
$18 \div 3 = ?$	$18 \div 7 = ?$	$18 \div 11 = ?$	$18 \div 15 = ?$
$18 \div 4 = ?$	$18 \div 8 = ?$	$18 \div 12 = ?$	$18 \div 16 = ?$

17.	18.	19.	20.
$9 + 9 = ?$	$8 + 8 = ?$	$7 + 7 = ?$	$6 + 6 = ?$
$9 + 7 = ?$	$8 + 6 = ?$	$7 + 5 = ?$	$6 + 4 = ?$
$9 + 5 = ?$	$8 + 4 = ?$	$7 + 3 = ?$	$6 + 2 = ?$

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
7	6	8	5	6	9	4	3	6	7
3	4	8	5	3	3	4	4	6	6
2	5	1	5	7	4	4	5	6	5
?	?	?	?	?	?	?	?	?	?
18	18	18	18	18	18	18	18	18	18

11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
4	4	3	6	6	7	8	7	8	4
4	5	4	6	0	7	8	6	9	7
4	4	4	2	6	2	0	0	0	6
4	5	3	3	6	2	2	5	1	1

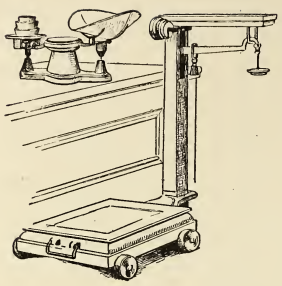
21. 18 is ? × 4 and (——) over.
22. 18 is ? × 8 and (——) over.
23. 18 is ? × 2 and (——) over.
24. 18 is ?× 9 and (——) over.
25. 18 is ? × 3 and (——) over.
26. 18 is ? × 5 and (——) over.
27. 18 is (——) more than 9.
28. 18 is (——) more than 11.
29. 18 is (——) more than 13.
30. 18 is (——) more than 15.
31. 18 is (——) more than 17.
32. 18 is (——) more than 16.
33. 18 is (——) more than 14.
34. 18 is (——) more than 12.
35. 18 is (——) more than 10.

36. Add:

6	8	8	9	7	9	5	5	7	7
7	7	9	9	6	5	6	9	9	7

37. Add:

8	7	6	5	4	3	9	8	8	7
8	5	9	8	9	8	3	6	4	4



NOTE. — It will not be time wasted to allow each child to use the scales, and find out for himself how many ounces there are in a pound.

1. What are the things in the picture called?
2. For what are they used?
3. Have you scales in your room?
4. Weigh a pound of sawdust.
5. Find out how many ounces there are in it.
6. Copy and fill blank:

—— ounces make 1 pound.

Oz. stands for ounce or ounces; lb. stands for pound or pounds.

7. How many ounces in $\frac{1}{2}$ of a pound?
8. How many ounces in $\frac{1}{4}$ of a pound?
9. 2 oz. is what part of a pound?
10. Guess at the weight of your arithmetic; weigh it.
11. Guess at the weight of different objects in the room, then weigh them to find your mistake.
12. Copy the following, and fill it out:

NAME.	GUESS.	WEIGHT.	MISTAKE.

NOTE. — The teacher should have a large variety of objects, such as bags of pease, corn, meal, sugar, sand, sawdust, etc.

The pupils should be allowed to spend several hours in estimating weight, and then testing their estimate.

Connect this with "store-keeping."

1. Take 18 inch sticks; arrange them into squares. How many squares have you?

2. Arrange them into triangles. How many triangles have you?

3. Arrange them into rectangles twice as long as wide. How many rectangles have you?

4. Make a rectangle whose perimeter is 18 inches. How long and how wide is it?

5. Make a rectangle whose perimeter and area are both 18 inches. How long and how wide have you made it?

6. How many square feet in a table 6 feet long and 3 feet wide?

7. What is the area in square feet of a flower bed 9 feet long and 2 feet wide?

8. Find the area of a path 18 feet long and 1 foot wide?

9. How many pairs of parallel lines can you form with 18 sticks?

10. How many acute angles can you form with 18 sticks?

11. How many pairs of adjacent lines can you make with 18 sticks?

12. How many faces have 3 cubes?

13. How many quarters ought you to give for a half dollar?

14. When a gallon of oil costs 12 cents, what will 1 quart cost?

15. If your mug holds a gill of milk, how many times can you fill it from a quart jug?

16. When milk is 3 cents a pint, how many quarts can I buy for 18 cents?

17. If a pound of meat costs 18 cents, what will $\frac{1}{3}$ of a pound cost?

18. When you know the price of a quart of milk, and the number of quarts, how can you find the cost of all the quarts?



10 + 9 = 19

9 + 10, or 10 + 9 = 19 XIX = 19

1.	2.	3.
19 − 14 = ?	19 − 17 = ?	19 − 8 = ?
19 − 11 = ?	19 − 3 = ?	19 − 5 = ?
19 − 9 = ?	19 − 10 = ?	19 − 7 = ?
19 − 4 = ?	19 − 2 = ?	19 − 13 = ?

4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
7	4	7	8	5	3	2	5	4	9
4	6	7	8	4	3	9	5	4	8
5	4	2	2	4	7	0	5	4	0
3	5	3	1	6	6	7	4	7	2

14.

8 { + 8 = ?
 ÷ 8 = ?
 − 8 = ?
 × 2 = ?

15.

12 { + 7 = ?
 ÷ 4 = ?
 × 1 = ?
 − 6 = ?

16.

6 { × 3 = ?
 ÷ 6 = ?
 + 12 = ?
 − 4 = ?

17.	18.	19.	20.
6 × 3 = ?	3 × 3 = ?	6 × 2 = ?	18 ÷ 9 = ?
9 × 2 = ?	3 × 5 = ?	8 × 2 = ?	18 ÷ 6 = ?
4 × 4 = ?	7 × 2 = ?	4 × 3 = ?	18 ÷ 3 = ?
5 × 2 = ?	5 × 3 = ?	7 × 1 = ?	18 ÷ 2 = ?

21.	22.	23.	24.	25.
5)19	6)19	4)19	6)12	3)15
7)19	9)19	2)19	2)13	4)16
3)19	8)19	3)18	4)12	8)16

1. $19 = ? \times 3$ and (——) over.
2. $19 = ? \times 5$ and (——) over.
3. $19 = ? \times 4$ and (——) over.
4. $19 = ? \times 2$ and (——) over.
5. $19 = ? \times 7$ and (——) over.
6. $19 = ? \times 6$ and (——) over.
7. $19 = \frac{1}{3}$ of 18 and (——) over.
8. $19 = \frac{1}{5}$ of 15 and (——) over.
9. $19 = \frac{1}{2}$ of 18 and (——) over.
10. $19 = \frac{1}{2}$ of $18 + \frac{1}{3}$ of 18 and (——) over.
11. $19 = 3 \times 6$ and (——) over.
12. $19 = 2 \times 7$ and (——) over.
13. 6 is contained in 19 (——) times and (——) over.
14. 8 is contained in 19 (——) times and (——) over.
15. 9 is contained in 19 (——) times and (——) over.
16. 7 is contained in 19 (——) times and (——) over.
17. 11 is contained in 19 (——) times and (——) over.
18. 15 is contained in 19 (——) times and (——) over.
19. 12 is contained in 19 (——) times and (——) over.
20. 5 is contained in 19 (——) times and (——) over.
21. 8 (——) and 9 (——) are (——).
22. 10 (——) and 9 (——) are (——).
23. 7 (——) and 8 (——) are (——).
24. 19 (——) less 9 (——) are (——).
25. 18 (——) less 7 (——) are (——).
26. 17 (——) less 10 (——) are (——).
27. 14 (——) and 5 (——) are (——).
28. 12 (——) and 7 (——) are (——).
29. $18 + ? = 19$. $19 - ? = 12$. $15 + ? = 19$.
30. $14 + ? = 19$. $19 - ? = 7$. $13 + ? = 19$.
31. $16 + ? = 19$. $19 - ? = 6$. $8 + ? = 19$.
32. $12 + ? = 19$. $19 - ? = 9$. $9 + ? = 19$.
33. $4 = \frac{1}{2}$ of ? $2 = \frac{1}{3}$ of ? $3 = \frac{1}{5}$ of ?
34. $6 = \frac{1}{3}$ of ? $4 = \frac{1}{4}$ of ? $3 = \frac{1}{6}$ of ?

1. Take 19 inch sticks. How many squares can you make?

2. How many triangles can you make?

3. Make 4 squares and 1 triangle. How many sticks are left?

4. How many sides have 4 squares and 1 triangle?

5. How many pentagons can you make? and how many sticks are unused?

6. Make 3 pentagons and 1 square; how many sticks are left?

7. How many sides have 3 pentagons and 1 square?

8. Draw a line 19 feet long. How much more than 6 yards is it?

9. Draw a line 19 inches long. How much more than 1½ feet is it?

10. 19 oranges are how many more than 1½ doz. oranges?

11. 19 days are how many days more than 2 weeks?

12. 19 ounces are how many ounces more than 1 pound?

13. 19 quarts are how many quarts more than 4 gallons?

14. 19 pints are how many pints more than 9 quarts?

15. 19 gills are how many gills more than 4 pints?

16. 19 pecks are how many pecks more than 4 bushels?

17. 19 quarts are how many quarts more than 2 pecks?

18. 19 months are how many months more than 1 year?

19. 19 cents are how many cents more than 1 dime?

20. If you drink 1 pint of milk every day for 2 weeks, how many quarts will you drink?

21. Jennie is 6 years old, and her sister is 1 year more than 3 times as old; how old is her sister?

22. Sight subtraction:

15	17	13	15	18	17	12	16	11	14
9	8	7	7	8	9	9	8	7	9

23. In 9 quarts and a pint there are (——) pints?

Illustrate each of these examples.

1. A man had $16. He paid $5 to one man, and $6 to another; how many dollars did he have left?

2. If 1 lb. of sugar costs 8 cents, what will 2 lb. cost?

3. If 1 lb. of fish costs 9 cents, what will 2 lb. cost?

4. What cost 3 quarts of berries at 6 cents a quart?

5. What cost 4 bushels of cranberries at $3 a bushel?

6. At $4 a yard, what cost 4 yd. of broadcloth?

7. How many lemons at 4 cents each will pay for 4 oranges at 2 cents each?

8. How many pears at 3 cents each will pay for 3 melons at 6 cents each?

9. When 10 cents are paid for 5 rolls of candy, how much must be paid for 6 rolls?

10. If a cocoanut is worth 9 cents, what is $\frac{1}{3}$ of it worth?

11. If a cord of wood costs $6, what does $\frac{1}{3}$ of it cost?

12. When $8 are paid for a ton of coal, what must be paid for $\frac{1}{4}$ of a ton?

13. If a barrel of sugar is worth $18, what is $\frac{1}{3}$ of a barrel worth?

14. If $\frac{1}{4}$ of an orange is worth 1 cent, what is the whole of it worth?

15. If $\frac{1}{8}$ of a pound of beef is worth 3 cents, what is a pound worth?

16. At $5 a yard, what will $\frac{1}{5}$ of a yard of cloth cost?

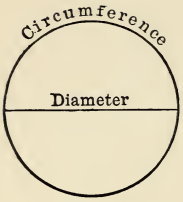
17. At $6 a ton, what will $1\frac{1}{2}$ tons of coal cost?

18. If 1 lb. of cheese costs 12 cents, what will $\frac{1}{4}$ of a pound cost?

19. If 1 bushel of beans is worth $4, what is $\frac{1}{3}$ of a bushel worth?

20. If 4 dimes will buy 1 yard of cloth, what part of a yard will 1 dime buy?

21. If a barrel of flour costs $6, what part of a barrel can you buy for $2?



Copy: Circle; Circumference; Diameter.

1. Make this figure on your paper.

2. Do you know what it is called?

3. Write its name on your paper.

4. Point to the line that bounds the circle. What name do we give this line?

5. Point to the line drawn through the circle. What name do we give to this line?

6. Make a circle, and write the words circumference and diameter in their right places.

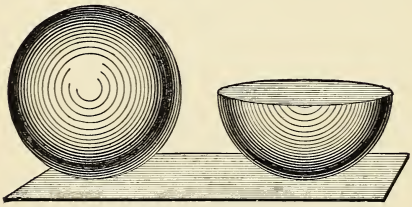
7. See if you can find 5 circles in the room.

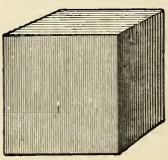
8. See if you can find 5 circles on your way home from school. Find 5 at home.

9. Make a circle on your paper, and make a square beside it.

10. Tell five points in which these figures are unlike.

11. Mold a cube and 2 spheres of clay. Cut one of the spheres in two. Each half is called a hemisphere.





12. Do the objects that you have molded look like these pictures?

13. State the likenesses and differences in these figures.

14. Think of some objects in the form of a sphere.

15. Think of some objects in the form of a hemisphere.

16. Think of some objects in the form of a cube.

17. What is the difference between the surface of the sphere and the surface of the cube?

ADDITION.

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
5	4	5	2	8	5	4	6	4	4
7	3	9	5	4	1	5	5	5	6
4	5	4	4	5	4	4	4	5	4

11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
7	6	6	4	4	4	6	4	6	5
6	3	9	2	8	5	4	6	6	5
4	4	4	6	6	6	1	4	4	5

21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
7	7	6	2	7	5	1	7	7	7
4	4	4	7	4	4	7	4	6	6
7	3	9	4	8	7	4	4	5	6

31.	32.	33.	34.	35.	36.	37.	38.	39.	40.
8	4	8	4	8	8	8	8	8	8
7	3	2	2	3	5	2	4	6	7
4	8	9	8	8	4	6	5	4	3

41.	42.	43.	44.	45.	46.	47.	48.	49.	50.
9	7	9	9	8	9	4	4	4	5
3	9	9	4	9	4	9	9	6	9
4	2	1	2	2	5	1	5	9	5

51.	52.	53.	54.	55.	56.	57.	58.	59.	60.
5	5	6	8	4	9	6	7	6	3
7	8	3	4	9	2	8	2	9	4
3	6	5	7	6	7	5	9	4	9

61.	62.	63.	64.	65.	66.	67.	68.	69.	70.
9	8	9	8	9	7	6	8	6	5
9	8	8	7	7	7	9	6	7	9

SUBTRACTION.

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
5	4	7	9	8	9	11	13	12	16
2	3	4	5	6	7	8	9	3	7
11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
3	7	5	6	12	12	15	10	9	19
2	3	4	5	6	7	8	9	6	3
21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
6	5	9	11	10	13	15	13	7	8
2	3	4	5	6	8	9	6	5	7
31.	32.	33.	34.	35.	36.	37.	38.	39.	40.
9	8	11	8	13	11	9	11	17	12
2	3	4	5	6	7	8	9	8	8
41.	42.	43.	44.	45.	46.	47.	48.	49.	50.
7	10	6	13	11	15	16	17	13	18
2	3	4	5	6	7	8	9	7	9
51.	52.	53.	54.	55.	56.	57.	58.	59.	60.
10	9	10	10	15	10	11	12	12	16
2	3	4	5	6	7	8	9	5	7
61.	62.	63.	64.	65.	66.	67.	68.	69.	70.
8	11	13	14	7	14	14	16	11	15
2	3	4	5	6	7	8	9	3	9
71.	72.	73.	74.	75.	76.	77.	78.	79.	80.
4	6	8	7	14	16	17	14	18	12
2	3	4	5	6	7	8	9	9	4

Make an example to illustrate each combination in this lesson.

1.	2.	3.	4.
$9+8=?$	$6+3=?$	$7+5=?$	$8+3=?$
$3+6=?$	$4+8=?$	$6+9=?$	$1+9=?$
$3+9=?$	$4+7=?$	$6+8=?$	$2+7=?$
$6+4=?$	$5+7=?$	$4+2=?$	$5+2=?$

5.	6.	7.	8.
$9+5=?$	$5+5=?$	$4+9=?$	$5+3=?$
$7+6=?$	$3+5=?$	$9+9=?$	$8+5=?$
$9+6=?$	$3+6=?$	$2+9=?$	$8+7=?$
$3+3=?$	$6+6=?$	$8+9=?$	$7+7=?$

9.	10.	11.	12.
$8+8=?$	$9+3=?$	$7+8=?$	$3+8=?$
$5+9=?$	$7+3=?$	$7+9=?$	$9+7=?$
$6+7=?$	$7+2=?$	$5+6=?$	$9+4=?$
$4+6=?$	$6+5=?$	$5+4=?$	$5+8=?$

13.	14.	15.	16.
$17-9=?$	$9-3=?$	$12-7=?$	$11-8=?$
$9-6=?$	$12-4=?$	$15-6=?$	$10-9=?$
$12-3=?$	$11-7=?$	$14-8=?$	$9-2=?$
$10-4=?$	$12-5=?$	$6-2=?$	$7-5=?$

17.	18.	19.	20.
$14-9=?$	$10-5=?$	$13-4=?$	$8-5=?$
$13-7=?$	$8-3=?$	$18-9=?$	$13-8=?$
$15-9=?$	$9-3=?$	$11-2=?$	$15-8=?$
$6-3=?$	$12-6=?$	$17-8=?$	$14-7=?$

1. In a street there were 15 doves picking up corn, but a dog frightened away 8 of them. How many were left?

2. There were 16 houses on a street, but a fire burned 7 of them. How many were not burned?

3. Two boys started from the same place. One ran north 12 yards, and the other south 7 yards. How far apart were they then? (Illustrate.)

4. If the 2 boys had both gone north, how far apart would they have been? (Illustrate.)

5. I bought a watch for $11, and sold it for $17. How many dollars did I gain?

6. If a deer runs 15 miles in an hour, and a dog runs 18 miles in the same time, how many miles has the dog gained on the deer?

7. A man paid $18 for a gun, which was $1 less than he paid for a dog. How much did he pay for his dog?

8. A man bought a load of hay for $16, and sold it for $19. How many dollars did he gain?

9. There were enough quart bottles on a shelf to hold 18 pints. How many bottles were there?

10. Write all the facts you can about 19.

11. If a table is 6 feet on one side, and 3 feet on the other, how many yards is it all round the table?

12. If a table is 6 feet long and 3 feet wide, how many square feet are there in the top of the table? In $\frac{1}{2}$ of the table? In $\frac{1}{3}$ of it? In $\frac{1}{6}$ of it?

13. If you had $\frac{3}{4}$ of a dollar, and gave away $\frac{1}{4}$, how many fourths were left?

14. If you have a pear, and eat $\frac{1}{3}$ of it, how many thirds will be left?

15. If you have 2 pears, and cut them into thirds, and divide the pieces equally among 3 boys, how many pieces will you give to each boy?



10 + 10 = 20

10 + 10 = 20 XX = 20

1.	2.	3.
1 × 2 = ?	6 × 2 = ?	1 × 3 = ?
2 × 2 = ?	7 × 2 = ?	2 × 3 = ?
3 × 2 = ?	8 × 2 = ?	3 × 3 = ?
4 × 2 = ?	9 × 2 = ?	4 × 3 = ?
5 × 2 = ?	10 × 2 = ?	5 × 3 = ?

4.	5.	6.	7.
5 × 4 = ?	1 × 7 = ?	1 × 9 = ?	20 ÷ 2 = ?
1 × 6 = ?	2 × 7 = ?	2 × 9 = ?	20 ÷ 4 = ?
2 × 6 = ?	1 × 8 = ?	1 × 10 = ?	20 ÷ 5 = ?
3 × 6 = ?	2 × 8 = ?	2 × 10 = ?	20 ÷ 10 = ?

8.	9.	10.	11.
20 = 9 + ?	20 = 8 + ?	20 = 2 + ?	20 = 3 + ?
20 = 7 + ?	20 = 6 + ?	20 = 5 + ?	20 = 11 + ?
20 = 10 + ?	20 = 16 + ?	20 = 14 + ?	20 = 13 + ?
20 = 4 + ?	20 = 15 + ?	20 = 12 + ?	20 = 17 + ?

12.	13.	14.	15.
16 + ? = 20	18 + ? = 20	19 + ? = 20	11 + ? = 20
14 + ? = 20	8 + ? = 20	17 + ? = 20	9 + ? = 20
12 + ? = 20	6 + ? = 20	15 + ? = 20	7 + ? = 20
10 + ? = 20	4 + ? = 20	13 + ? = 20	5 + ? = 20

16.	17.	18.	19.
20 − ? = 14	20 − 15 = ?	13 + 7 = ?	12 + 6 = ?
20 − ? = 9	20 − 11 = ?	12 + 8 = ?	11 + 8 = ?
20 − ? = 12	20 − 8 = ?	11 + 9 = ?	16 + 2 = ?
20 − ? = 16	20 − 13 = ?	14 + 6 = ?	11 + 7 = ?

1.	2.	3.	4.
2)20	6)20	10)20	14)20
3)20	7)20	11)20	15)20
4)20	8)20	12)20	16)20
5)20	9)20	13)20	20)20

5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
4	2	2	7	2	6	5	4	7	5
2	3	9	4	7	6	5	4	7	5
6	4	3	3	1	6	5	9	6	4
3	5	4	2	7	?	?	?	?	?
?	?	?	?	?					
20	20	20	20	20	20	20	20	20	20

15. $4+4+4+4=?$
$5+5+5+5=?$
$3+3+3+3=?$
$6+6+6+2=?$
$\underline{2}+\underline{2}+\underline{2}+\underline{6}=?$

16. $4+7+5+3=?$
$5+6+4+4=?$
$7+4+5+3=?$
$2+1+5+8=?$
$\underline{2}+\underline{1}+\underline{0}+\underline{1}=?$

17. 20 = ? times 4 and (——) over.
18. 20 = ? times 2 and (——) over.
19. 20 = ? times 3 and (——) over.
20. 20 = ? times 6 and (——) over.
21. 20 = ? times 5 and (——) over.
22. 20 = ? and 1 and (——) over.
23. 20 = ? and 9 and (——) over.
24. 20 = ? and 7 and (——) over.
25. 20 = ? times 3 and ½ of (——).

1.	2.	3.	4.
$1 \times 2 = ?$	$6 \times 2 = ?$	$11 \times 2 = ?$	$4 \times 3 = ?$
$3 \times 2 = ?$	$8 \times 2 = ?$	$12 \times 2 = ?$	$6 \times 3 = ?$
$5 \times 2 = ?$	$10 \times 2 = ?$	$1 \times 3 = ?$	$8 \times 3 = ?$
$2 \times 2 = ?$	$7 \times 2 = ?$	$3 \times 3 = ?$	$5 \times 3 = ?$
$4 \times 2 = ?$	$9 \times 2 = ?$	$2 \times 3 = ?$	$7 \times 3 = ?$

5.	6.	7.	8.
$9 \times 3 = ?$	$4 \times 4 = ?$	$2 \times 5 = ?$	$1 \times 6 = ?$
$10 \times 3 = ?$	$6 \times 4 = ?$	$4 \times 5 = ?$	$3 \times 6 = ?$
$1 \times 4 = ?$	$5 \times 4 = ?$	$6 \times 5 = ?$	$5 \times 6 = ?$
$3 \times 4 = ?$	$7 \times 4 = ?$	$3 \times 5 = ?$	$2 \times 6 = ?$
$2 \times 4 = ?$	$1 \times 5 = ?$	$5 \times 5 = ?$	$4 \times 6 = ?$

9.	10.	11.	12.
$1 \times 7 = ?$	$1 \times 8 = ?$	$2 \times 9 = ?$	$27 \div 3 = ?$
$3 \times 7 = ?$	$3 \times 8 = ?$	$3 \times 9 = ?$	$21 \div 3 = ?$
$2 \times 7 = ?$	$1 \times 9 = ?$	$1 \times 10 = ?$	$24 \div 3 = ?$
$4 \times 7 = ?$	$2 \times 8 = ?$	$3 \times 10 = ?$	$30 \div 3 = ?$

13.	14.	15.	16.
$18 \div 3 = ?$	$28 \div 4 = ?$	$30 \div 5 = ?$	$30 \div 6 = ?$
$9 \div 3 = ?$	$20 \div 4 = ?$	$15 \div 5 = ?$	$12 \div 6 = ?$
$15 \div 3 = ?$	$24 \div 4 = ?$	$25 \div 5 = ?$	$24 \div 6 = ?$
$12 \div 3 = ?$	$16 \div 4 = ?$	$20 \div 5 = ?$	$18 \div 6 = ?$

17.	18.	19.	20.
$30 \div 2 = ?$	$20 \div 2 = ?$	$10 \div 2 = ?$	$3 \div 3 = ?$
$22 \div 2 = ?$	$12 \div 2 = ?$	$6 \div 3 = ?$	$18 \div 9 = ?$
$26 \div 2 = ?$	$18 \div 2 = ?$	$8 \div 2 = ?$	$12 \div 4 = ?$
$28 \div 2 = ?$	$14 \div 2 = ?$	$2 \div 2 = ?$	$10 \div 5 = ?$
$24 \div 2 = ?$	$16 \div 2 = ?$	$4 \div 2 = ?$	$8 \div 4 = ?$

1.
$6+7+4+5=?$
$7+7+7+7=?$
$8+8+8+6=?$
$9+6+6+7=?$

2.
$9+8+6+5=?$
$4+7+5+7=?$
$8+5+9+6=?$
$7+9+8+3=?$

3.
$9+9+9+3=?$
$8+8+8+5=?$
$5+5+6+9=?$
$6+8+5+9=?$

4.
$6+5+6+5=?$
$7+6+7+6=?$
$8+9+8+9=?$
$7+9+7+9=?$

5.
$4+9+9+4=?$
$8+3+3+8=?$
$7+7+7+7=?$
$9+4+8+5=?$

6.
$7+5+8+9=?$
$6+8+9+7=?$
$5+4+5+5=?$
$9+8+4+8=?$

7.
$3+3+3+3=?$
$4+4+4+4=?$
$5+5+5+5=?$
$6+6+6+6=?$

8.
$4+4+4+4=?$
$5+5+5+5=?$
$6+6+6+6=?$
$7+7+7+7=?$

9.
$5+6+5+6=?$
$6+7+6+7=?$
$7+8+7+8=?$
$8+9+4+6=?$

10.
$6+8+8+7=?$
$9+6+6+9=?$
$8+4+7+5=?$
$7+5+8+6=?$

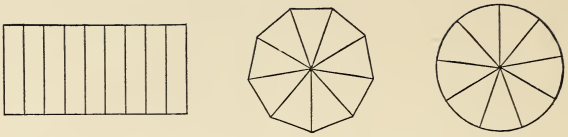
11.
$7+6+4+2=?$
$6+8+3+5=?$
$3+9+7+8=?$
$5+3+8+9=?$
$4+3+5+6=?$

12.
$9+8+7+6=?$
$2+3+4+5=?$
$6+7+8+9=?$
$5+9+6+4=?$
$8+2+5+3=?$

Make rectangles of the following measurements, and then find their area and perimeter.

1. 10 inches long and 2 inches wide.
2. 10 inches long and 3 inches wide.
3. 9 inches long and 2 inches wide.
4. 9 inches long and 3 inches wide.
5. 8 inches long and 4 inches wide.
6. 8 inches long and 2 inches wide.
7. 8 inches long and 3 inches wide.
8. 7 inches long and 4 inches wide.
9. 6 inches long and 5 inches wide.
10. 5 inches long and 5 inches wide.
11. 7 inches long and 3 inches wide.
12. 6 inches long and 4 inches wide.
13. 7 inches long and 2 inches wide.
14. 6 inches long and 3 inches wide.
15. 5 inches long and 4 inches wide.
16. 4 inches long and 4 inches wide.
17. 5 inches long and 3 inches wide.
18. 4 inches long and 3 inches wide.
19. How many rows of inch squares did you find in each of these rectangles?
20. How many inch squares did you find in each row?
21. Draw the right diagonal in the first 6 rectangles.
22. Draw the left diagonal in the last 6 rectangles.
23. How many yards of fence must a man build around his yard if it is 9 yards long and 6 yards wide?
24. How many square inches in the surface of a rectangle 3 inches wide and 9 inches long?
25. What is the area of a 5-inch square?
26. If your garden bed is 8 feet long and 4 feet wide, what is the distance around it?

NOTE. — In each case have the pupils tell you the number of units in a row, and the number of rows.



1. Into how many parts is each figure divided?

2. What is each part called?

3. Point to $\frac{1}{9}$ of the circle. Of the square. Of the nonagon.

4. Draw a line 9 inches long, and divide it into 9 equal parts.

5. Point to $\frac{2}{9}$ of the line.

6. Draw a rectangle 9 inches long and 1 inch wide. Cross off $\frac{1}{9}$ of it.

7. Draw a rectangle 6 inches long and 3 inches wide. Cross off $\frac{1}{9}$ of it.

8. What is $\frac{1}{9}$ of 9? 18? 27?

9. What is $\frac{2}{9}$ of 9? 18? 27?

10. What is $\frac{3}{9}$ of 9? 18? 27?

11. Show by drawing that $\frac{1}{3}$ and $\frac{3}{9}$ are equal.

12. Which is larger, $\frac{1}{9}$ of 9 or $\frac{1}{3}$ of 9?

13. Which is larger, $\frac{2}{9}$ of 9 or $\frac{1}{9}$ of 9?

14. Which is larger, $\frac{1}{9}$ of 9 or $\frac{1}{6}$ of 12?

15. If you have an apple, how many ninths of an apple have you?

16. If you have an apple, and give away $\frac{3}{9}$ of it, how many ninths have you left?

17. Show by drawings that $\frac{2}{6}$ and $\frac{1}{3}$ are equal.

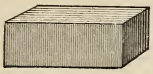
18. $\frac{2}{9} + \frac{2}{9} = \frac{\square}{9}$. $\frac{6}{9} = \frac{\square}{3}$. $\frac{7}{9} + \frac{1}{9} = \frac{\square}{9}$.

19. $\frac{2}{9} + \frac{1}{9} = \frac{\square}{3}$. $\frac{9}{9} = \frac{\square}{3}$. $\frac{4}{9} + \frac{3}{9} = \frac{\square}{9}$.

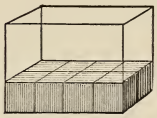
20. $\frac{9}{9} - \frac{6}{9} = \frac{\square}{9}$. $\frac{3}{9} = \frac{\square}{3}$. $\frac{3}{9} + \frac{3}{9} = \frac{\square}{9}$.

21. $\frac{4}{9} + \frac{5}{9} = \frac{\square}{9}$. $\frac{6}{9} = \frac{\square}{6}$. $\frac{5}{9} + \frac{1}{9} = \frac{\square}{9}$.

22. $\frac{2}{9} + \frac{1}{9} = \frac{\square}{3}$. $\frac{3}{9} = \frac{\square}{6}$. $\frac{8}{9} - \frac{5}{9} = \frac{\square}{3}$.



A Rectangular Solid



1. Take some inch cubes. Make a rectangle 4 inches long and 2 inches wide. How many cubes are in each row? How many rows are there?

2. Put another layer of cubes on top of the first layer. How many cubes are in this layer?

3. Put another layer on top of the other two. What form have you now?

4. How many layers have you? How many cubes in each layer?

5. How many cubes are there in the prism?

6. Make a cube that shall have 4 cubes on each side. How many layers have you made? How many cubes are in each layer?

7. Out of your cubes make a rectangle 6 inches long and 3 inches wide. Put on top 2 more layers like the first. Is this a cube? Why?

8. Make a prism 9 inches long, 2 inches wide, and 3 inches high. Tell how many layers you have, how many rows in each layer, and how many cubes in a row.

9. Do the same for each of the following: A prism 4 inches long, 4 inches wide, and 6 inches high.

10. A 5-inch cube.

11. A prism 5 inches long, 4 inches wide, and 6 inches high.

12. A prism 6 inches long, 3 inches wide, and 8 inches high.

13. A prism 6 inches long, 4 inches wide, and 6 inches high.

14. A 6-inch cube.

Copy and learn :

60 seconds make 1 minute.
60 minutes make 1 hour.
24 hours make 1 day.
7 days make 1 week.
52 weeks make 1 year.
12 months make 1 year.

1. If you are asleep $\frac{1}{3}$ of the day, how many hours are you asleep?

2. How many hours in the forenoon are you at school?

3. How many hours are you in school in a day?

4. Copy and learn :

"Thirty days hath September,
April, June, and November."

February has 28 days, and in leap year 29 days. The other months have 31 days each.

5. Write the names of the months in order, and after each write the number of days in it.

6. What month is it now? How many days has it?

7. How many weeks are there in 30 working days?

8. How many days from the 11th of June to the 9th of July?

9. How many days from the 25th of September to the 25th of October?

10. Tell the pupils to call the knuckle of the fore finger January, the space between the fore finger and the middle finger February, the next knuckle March, the next space April, the next knuckle May, the next space June, the knuckle of the little finger July. Now come back to the knuckle of the fore finger for August, and continue to the end of the year. All the months that have 31 days come on the knuckles, and those that have less than 31 come between the knuckles. This is an aid that every pupil always carries with him.

a	4	7	5	3	4	9	6	8	2	7	4	2	*a*
b	6	4	7	5	7	8	5	3	9	4	6	8	*b*
c	6	8	6	5	7	8	8	7	8	5	7	7	*c*
d	4	4	8	9	5	4	3	9	1	9	8	5	*d*
e	2	3	4	6	7	8	7	2	7	1	6	4	*e*
f	5	5	6	9	1	7	1	9	1	8	9	9	*f*
g	1	2	3	5	6	1	7	8	9	6	5	4	*g*
h	4	5	6	8	9	1	3	4	3	9	1	7	*h*
i	3	4	5	2	3	4	9	7	2	8	9	1	*i*
j	4	5	5	4	5	9	1	2	3	9	1	2	*j*
k	8	7	4	3	1	8	4	6	7	8	7	5	*k*
l	7	5	6	8	9	1	2	4	8	8	6	3	*l*

1. Add lines *a* and *b*; *b* and *c*, etc.
2. Add lines *a*, *b*, and *c*; *b*, *c*, and *d*, etc.
3. Add any four lines.
4. Multiply each line by 2.
5. Multiply each line by 3.
6. Add *a* and *b*, and from the sum take *c*.
7. Add *b* and *c*, and from the sum take *d*.
8. Add *c* and *d*, and from the sum take *e*.
9. Add *d* and *e*, and from the sum take *f*.
10. Add *e* and *f*, and from the sum take *g*.
11. Add *a* and *c*, and from the sum take *b*.
12. Add *c* and *d*, and from the sum take *a*.
13. Add *c* and *d*, and from the sum take *b*.
14. Add *d* and *e*, and from the sum take *a*.
15. Add *k* and *l*, and from the sum take *j*.
16. Multiply *c* by 2, and from the product subtract *b*.
17. Multiply *c* by 3, and from the product subtract the sum of *a* and *b*.
18. Multiply *c* by 2, and from the product subtract *d*.
19. Multiply *b* by 3, and from the product subtract *a*.

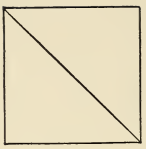


Fig. 1.

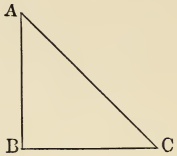


Fig. 2.

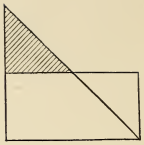


Fig. 3.

1. Bring 4 squares to school to-morrow, and 4 rectangles. Let the squares measure 4 inches on a side, and the rectangles 6 inches by 4 inches.

2. Take a square, draw its diagonal. Take a pair of scissors, and cut on the diagonal. Into what have you divided the square? Do the same to one of the rectangles.

3. What part of the whole square or rectangle is one of the right triangles?

4. Take another square and rectangle, and find how many square inches there are in each of them?

5. If the right-triangle is $\frac{1}{2}$ of the square, and the square contains 16 square inches, how many square inches are there in the right-triangle?

6. Take one of your right-triangles, and place it on your desk in the position of Fig. 2. Place A on B and fold. Cut it where you have creased it. Place the pieces as in Fig. 3. What figure have you?

7. Place beside this rectangle a right-triangle. How do they compare in length? How in height or altitude?

8. Two right-triangles of the same size will make what?

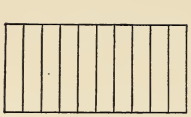
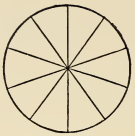
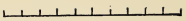
9. Make 4 squares or rectangles by putting right-triangles together.

10. Into what figure can you change a right-triangle?

11. Change 4 right-triangles into 4 rectangles.

12. A right-triangle has a base of 6 inches and an altitude of 6 inches. Change it into a rectangle having the same area. Find the area.

1. Draw a circle on your paper.
2. Draw its diameter.
3. Draw a 5-inch square.
4. Draw its diagonal.
5. Find the perimeter of the square.
6. Find the area of the square.
7. Draw a pair of parallel lines.
8. Draw a pair of adjacent lines.
9. Draw two pairs of perpendicular lines.
10. Draw two pairs of horizontal lines.
11. Draw two vertical lines.
12. Draw an acute angle.
13. Draw an obtuse angle.
14. Draw a right angle.
15. Draw a triangle having only acute angles.
16. Draw a triangle having one right angle.
17. Draw a triangle having one obtuse angle.
18. Write the table for Liquid Measure.
19. Write the table for Dry Measure.
20. Write the table for Time Measure.
21. Write the table for U. S. money.
22. Write the names of the Spring months.
23. Write the names of the Summer months.
24. Write the names of the Autumn months.
25. Write the names of the Winter months.
26. Write the names of the days of the week.
27. Write the abbreviations for the words used in answering the questions in this lesson.
28. Write all the odd numbers from 1 to 30.
29. Write all the even numbers from 1 to 30.
30. Write in Roman notation all the numbers from 1 to 20.
31. If each face of a cube is a 2-inch square, how many square inches are there in the whole cube?

1. Into how many parts is each figure divided?

2. What is each part called?

3. Draw a rectangle 10 inches long and 1 inch wide; divide it into 10 equal parts.

4. Draw a rectangle 5 inches long and 2 inches wide; divide it into 10 equal parts.

5. Draw a line 10 inches long, and cut off $\frac{1}{10}$ of it.

6. Draw a line 20 inches long, and cut off $\frac{1}{10}$ of it.

7. Draw a line 30 inches long, and cut off $\frac{1}{10}$ of it.

8. If you divide some apples equally among 10 children, what part of the apples do you give to each?

9. If a man divides 20 cents equally among 10 girls, how many cents does each girl receive?

10. How many are $\frac{1}{10}$ and $\frac{2}{10}$?

11. Which is larger, $\frac{2}{10}$ of an apple or $\frac{1}{5}$ of it? Illustrate.

12. Which is larger, $\frac{1}{2}$ of an apple or $\frac{5}{10}$ of it? Illustrate.

13. Which is greater, $\frac{2}{3}$ or $\frac{2}{10}$? Illustrate.

14. Draw 20 lines on your slate, and let $\frac{5}{10}$ of them be vertical, and the rest horizontal. How many are horizontal?

15. A boy had 10 apples, and gave away $\frac{2}{10}$ of them. How many had he left?

16. Take 30 blocks, and give $\frac{1}{10}$ of them to each of 5 of your classmates. How many have you left?

17. From 30 blocks take away $\frac{1}{10}$ of them, then $\frac{1}{3}$ of the remainder, then $\frac{1}{2}$ of the second remainder, then $\frac{1}{3}$ of the last remainder. How many blocks are left?

18. If you have 20 pieces of candy, and divide $\frac{3}{10}$ of them equally among 2 girls, how many pieces will each receive?

1. What will ½ a pound of sugar cost at 6 cents a pound? What will 3 pounds cost?

2. Arthur has $24 in a bank, and George has ⅓ as much. How much has George? If Arthur takes out $8, and George puts in $8, how much will each then have in the bank?

3. Make 7 vertical lines on the blackboard, each 2 inches apart. How far apart are the 2 outside lines?

4. If you buy a gallon of milk for 20 cents, and sell it at 6 cents a quart, how much will you gain on the gallon?

5. If you have a dozen oranges, and give away 7 of them, how much are the rest worth at 3 cents apiece?

6. If 10 shovels cost $20, how much will 8 shovels cost?

7. If your father pays $27 for 3 cords of wood, how much would he have to pay for 2 cords?

8. What will 3 papers of tacks cost at 8 cents a paper?

9. What will 10 pieces of braid cost at 3 cents each?

10. To 21 add ⅓ of 21, divide by ⅛ of 24, subtract ⅕ of 25, and multiply by ⅓ of 30. Write result.

11. 25 cents are how many half-dimes?

12. If you have 25 cents, and buy a ball for 10 cents, and a bat for 8 cents, how many cents will you have left?

13. A 4-gallon jar will hold how many quarts?

14. Fill the blank spaces:

3	4	5	7	4	7	9	6	8	3
6	7	6	7	2	8	9	6	9	6
3	6	8	8	9	6	9	8	7	4
?	?	?	?	?	?	?	?	?	?
15	20	21	30	22	24	30	25	29	16

15. John has a quarter of a dollar and James has 2 dimes. How many cents can John spend and still have as much as James?

16. If 4 men can do a piece of work in 6 days, how many days will it take 1 man?

1. Give the pupils a box 6 inches long, 4 inches wide, and 3 inches deep. Measure this box. With your inch cubes make a pile just as large. How many inch cubes have you used in each layer? How many inch cubes are there in each face?

2. Find the area and perimeter of a flower bed 8 feet long and 1 yard wide?

3. How many months in 2 years?

4. How many yards in 21 feet?

5. How many pecks in 24 quarts?

6. How many dimes in 30 cents?

7. How many single things in 2 dozen things?

8. Is 10 odd or even? How much must you add to it to make it odd?

9. How many pounds in 18 ounces?

10. How many eights in $\frac{1}{2}$?

11. Illustrate. How many square inches in a right-triangle having 5 inches for its base and 4 inches for its altitude?

12. If 1 quart of grass seed costs $\frac{1}{2}$ of a dollar, what will 1 peck cost?

13. How many gallons in 28 quarts?

14. How many pints in 10 quarts?

15. Turn the pointers in the clock dial so as to read 2.15 P.M.

16. Guess at the height of your desk. Measure it.

17. How many dollars in 30 dimes?

18. Guess at the width of the road in yards. Measure it.

19. Name the months in the first half of the year.

20. Write the abbreviations for the months of the second half of the year.

21. Keep store. Let each pupil be store-keeper, and make change for two transactions, and also go to the store twice to buy something.